Series 1955, No. 11

Issued May 1963

SOIL SURVEY

Fairfax County Virginia

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
VIRGINIA AGRICULTURAL EXPERIMENT STATION
and
FAIRFAX COUNTY, VIRGINIA

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY provides basic facts about the soils of Fairfax County. These facts will increase our understanding of the land on which we live and our ability to work with nature. They will aid us in using the land most efficiently in farming, in practicing soil and water conservation, and in planning for urban and interurban development.

In making this survey, soil scientists walked over the fields and woodlands. They examined surface soils, subsoils, and parent materials; measured slopes with a hand level; noticed differences in growth of crops, weeds, and brush; and, in fact, recorded all the things about the soils that they believed might affect their suitability for farming, trees, wildlife, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. Then, cartographers prepared from the photographs the detailed soil map in the back of this report. Fields, woods, roads, streams, and many other landmarks can be seen on the map.

Locating the soils

Use the index to map sheets to locate your property on the large map. The index is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located. When the sheet of the large map is found on which your property is located, it will be seen that boundaries of the soils are outlined, and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose, for example, an area located on the map has the symbol Mh. The legend for the detailed map shows that this symbol identifies Matapeake silt loam, nearly level phase. This soil and all others mapped in Fairfax County are described in the section "Descriptions of the Soils."

Finding information

Special sections of the report will interest different groups of readers. The section "Soil Associations" will be of interest mainly to those not familiar with the county.

Farmers and those who work with farmers can learn about the soils in the section "Descriptions of the Soils," and then turn to the section "Use and Management of the Soils." In this way they first identify the soils on their farm and then learn how the soils can be managed and what yields can be expected. The soils are grouped by capability units; that is, groups of soils that need similar management and respond in about the same way. For instance, in the section "Descriptions of the Soils," Matapeake silt loam, nearly level phase, is shown to be in capability unit I-1. The management this soil needs will be stated under the heading "Capability Unit I-1" in the section "Use and Management of the Soils."

People interested in science will find information about how the soils are formed and how they were classified in the section "Classification and Morphology of the Soils."

Engineers and others who use soil as a material in construction will find helpful information in the section "Engineering Properties of the Soils."

Students, teachers, and other users will find information about the soils and their management in various parts of the report, depending on their particular interest.

The soil survey map and report are also useful to appraisers, assessors, purchasers, developers, bankers, and others who are concerned with the use and management of land.

Technical assistance

The soil survey is not intended to be a source of all information needed for the successful operation of a farm in Fairfax County. Information on crop varieties, fertilizers, soil conserving practices, and livestock management can be obtained from the county agricultural agent.

Farmers in Fairfax County are in the Northern Virginia Soil Conservation District. The district, through its officials, arranges for farmers to receive technical help from the Soil Conservation Service in planning good use and conservation of the soils on their farms. This soil survey is part of the technical assistance made available to the Northern Virginia Soil Conservation District. County officials and agencies requested the soil survey, and for several years the county has employed a soil scientist to help interpret the soil maps and soil characteristics.

The "Guide to Mapping Units and Capability Units" at the end of the report will simplify the use of the map and the report. This guide gives the map symbol for each soil, the name of the soil, the page on which the soil is described; the capability unit in which the soil has been placed, and the page where the capability unit is described. Soil survey and engineering terms are defined in the Glossary in the back of the report.

* * * *

Fieldwork on the soil survey was completed in 1955. Unless explained otherwise, all statements refer to conditions at the time of the survey.

U.S. GOVERNMENT PRINTING OFFICE: 1963

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

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SOIL SURVEY OF FAIRFAX COUNTY, VIRGINIA

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE VIRGINIA AGRICULTURAL EXPERIMENT STATION AND FAIRFAX COUNTY, VIRGINIA

FAIRFAX COUNTY is in the northeastern part of Virginia. It has an area of 414 square miles, according to the 1954 U.S. Census of Agriculture. A large part of the county is in the Washington, D.C. Metropolitan Area. Fairfax County adjoins the State of Maryland along the Potomac River, and the counties of Arlington, Prince William, and Loudoun in Virginia. Fairfax, the county seat, is located near the center of the county, west of Washington, D.C., and north of Richmond, Virginia (fig. 1).

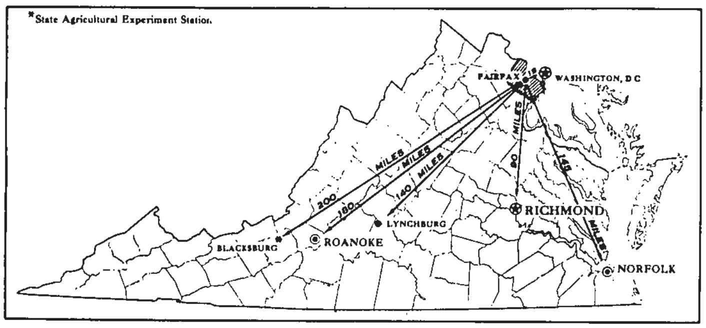

Figure 1.—**Location of Fairfax County in Virginia.**

Nature of the County

Physiography and Relief

Fairfax County lies in the northern parts of the Piedmont and Coastal Plain physiographic provinces (*4*).[1] The Piedmont Upland extends northeast and southwest through the center of the county and is bounded on the west by the Piedmont Lowland, composed of Triassic sediment, and by the Coastal Plain province on the east. There is a fairly large area between the Coastal Plain and Piedmont Upland that consists of about equal parts of high-lying Coastal Plain sediments and of Piedmont Upland materials. From west to east, the physiographic provinces of the county are subdivided into five sections: (1) Piedmont Lowland (or Triassic Lowland), (2) the Piedmont Upland, (3) the mixed Piedmont Upland and high Coastal Plain terraces, (4) the high Coastal Plain, and (5) the low Coastal Plain terraces.

The Piedmont Lowland (*Triassic*) comprises about 18 percent of the county and generally has an elevation of 250 to 300 feet above sea level. It is underlain by sedimentary rocks consisting of sandstone, shale, and conglomerate and a smaller percentage of igneous rocks, mainly diabase, syenite, and metadiorite. The general relief is one of wide undulating ridges and nearly level areas. There are small rolling, hilly, and steep areas near large streams.

The Piedmont Lowland slopes toward the southwest because it is adjacent to the higher lying Piedmont Upland on the east. Cub Run, Bull Run, Flatlick Branch, and Little Rocky Run drain the southern part and flow southeast into Occoquan Creek. The northern part is drained by Sugarland Run, which flows north into the Potomac River. The drainage pattern is dendritic, but is not so well developed as in the Piedmont Upland. A higher percentage of this section is flat and more poorly drained than in the Piedmont Upland or in the mixed Piedmont Upland and Coastal Plain. The coarse-textured soils in this section are adjacent to the Piedmont Upland because the heavier sediment was deposited along the edge of the lakebed. The fine-textured soils are mostly in the center of the section near the Loudoun County line.

The Piedmont Upland is the largest physiographic section and occupies about 33 percent of the county. It is underlain by metamorphic rocks, mainly quartz sericite schist, granite gneiss, and greenstone. This section extends in a north-south direction through the west-central part of the county. It is bounded on the west by the Piedmont Lowland (Triassic) and on the east by the mixed Piedmont Upland and high Coastal Plain.

The Piedmont Upland is well dissected. The interstream divides are fairly wide and are undulating and rolling except in places along the lower tributaries of large streams. Entrenchment along the lower tributaries of the major streams has been rapid. As a result, there are bluffs and V-shaped valleys with steep slopes that rise abruptly from the flood plain. The smooth uplands are 350 to 450 feet above sea level. This section is drained by Difficult, Nichols, and Colvin Runs in the north and by Wolf Run and Johnny Moore and Accotink Creeks in the south.

The drainage pattern is generally dendritic, and very few of the soils require artificial drainage to be suitable for cultivation. Flood plains are narrow and, in most places, are less than 200 feet above sea level.

[1] Italicized numbers in parentheses refer to Literature Cited, p. 103.

The mixed Piedmont Upland and high Coastal Plain terraces are bounded on the east by the high Coastal Plain terraces and on the west by the Piedmont Upland. This area occupies about 23 percent of the county and has an elevation of 300 to 400 feet above sea level in most places. It is along the fall line between the Piedmont Upland and Coastal Plain physiographic provinces. The soils have formed from metamorphic rocks—granite gneiss and quartz sericite schist—similar to those in the Piedmont Upland. The sedimentary deposits in which soils have formed and which overlie the Piedmont Upland are of fluvial, old alluvial, and marine origin. This sedimentary material usually occupies the broader ridgetops that have gentle to undulating slopes of less than 10 percent. The soils that developed in these sedimentary deposits occur in widely scattered areas that make up about one-half the acreage in this section.

The mixed Piedmont Upland and the high Coastal Plain terraces are drained mainly by Accotink and Pohick Creeks and by Holmes and Pimmit Runs. Pimmit Run flows north into the Potomac River, and Holmes Run flows toward the southeast. The drainage pattern is generally dendritic. Steep V-shaped valleys and a few bluffs have formed where large streams have deeply dissected the uplands. A small part of the section is so poorly drained that the soils need artificial drainage before they can be cultivated. Many soils formed in fluvial and alluvial sediment have a fragipan (dense subsoil), which causes them to drain slowly.

The high Coastal Plain occupies about 22 percent of the county and is along the eastern edge. Elevations range from 60 to 250 feet above sea level. This section covers two or three of the higher Coastal Plain terraces, mainly the Brandywine and Sunderland terraces, and small areas on the Wicomico terrace near the eastern boundary of the section. This section consists almost entirely of Coastal Plain sand, silt, clay, and gravel of marine or fluvial origin that overlie Piedmont Upland material, mainly granite gneiss and sericite schist.

Between this section and the low Coastal Plain there are hilly and steep areas along the large streams and near the breaks. Most of the section consists of wide upland ridges that are undulating and rolling. The drainage generally is toward the southeast and is fairly well developed. It consists of Accotink Creek and the Holmes, South, and Back Lick Runs. Many slowly permeable and many gravelly soils are in the section. The acreage of wet soils needing drainage is small.

The low Coastal Plain terraces occupy about 4 percent of the county. This section is in three different areas but is mainly on the Dismal Swamp terrace at levels that are 5 to 20 feet above sea level. This terrace is a young marine deposit consisting of highly stratified and mixed sand, silt, clay, and gravel. The topography is mostly nearly level and very gently undulating, but there are small areas of rolling and hilly terrain near the large creeks and rivers. The general drainage patterns are not well developed. Most of the soils are too wet for cultivation unless they are drained artificially.

Climate

Fairfax County has a continental, humid, temperate climate. Temperature and precipitation typical of the county are shown in tables 1 and 2. Seasonal temperature varies considerably. The difference between summer and winter mean temperature at the U.S. Weather Station in Chantilly, Va., is about 36 degrees. It is about 38 degrees at the Washington National Airport, Washington, D.C.

TABLE 1.—*Temperature and precipitation at Chantilly, Fairfax County, Va.*

[Elevation 320 feet]

Month	Average temperature	Precipitation [1]		
		Average	Wettest year (1948)	Driest year (1953)
	° F.	Inches	Inches	Inches
December	36. 35	3. 64	5. 03	3. 49
January	37. 61	3. 46	4. 07	3. 64
February	38. 05	2. 30	1. 23	1. 93
March	43. 23	3. 85	3. 35	5. 01
April	52. 98	3. 74	2. 83	4. 04
May	63. 00	5. 44	6. 88	7. 39
June	71. 46	[2] 3. 26	4. 27	2. 37
July	75. 66	[2] 4. 32	2. 01	3. 73
August	73. 00	[2] 4. 00	7. 99	1. 52
September	65. 36	3. 59	2. 98	3. 29
October	56. 34	2. 96	4. 53	3. 26
November	44. 88	3. 00	3. 88	1. 13
Year	54. 81	[2] 44. 76	49. 05	40. 80

[1] Six-year record; 1948 through 1953. Average snowfall, no data.
[2] Five-year record; 1948 through 1953, but 1951 excluded because of incomplete records.

TABLE 2.—*Temperature and precipitation at Washington National Airport, Washington, D.C.*

[Elevation, 14 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1954)	Wettest year (1948)	Average snowfall
	° F.	° F.	° F.	Inches	Inches	Inches	Inches
December	37. 7	75	1	2. 92	2. 82	4. 69	3. 2
January	37. 0	79	5	2. 75	2. 30	4. 57	4. 2
February	38. 6	82	5	2. 35	. 85	1. 67	3. 8
March	45. 4	89	11	3. 38	3. 47	3. 66	2. 8
April	56. 6	95	24	3. 03	3. 30	3. 05	(3)
May	65. 9	94	34	4. 39	2. 98	8. 87	0
June	74. 2	101	47	3. 42	1. 24	5. 44	0
July	78. 3	103	55	4. 34	1. 70	4. 31	0
August	76. 4	100	53	4. 98	3. 15	9. 00	0
September	70. 0	100	40	3. 28	. 63	3. 19	0
October	59. 5	94	30	3. 05	4. 06	3. 09	(3)
November	47. 8	85	16	3. 94	1. 78	6. 00	. 7
Year	57. 3	103	1	40. 83	28. 28	57. 54	14. 7

[1] Average temperature based on a 19-year record, through 1960; highest and lowest temperatures, on a 19-year record, through 1960.
[2] Average precipitation based on a 19-year record, through 1960; wettest and driest years based on a 19-year record, in the period 1942–1960; snowfall based on a 17-year record, through 1960.
[3] Trace.

The frost-free season at Chantilly, Va., is 175 days; in Washington, D.C., it is 200 days. The frost-free season generally is long enough for the maturing of the field crops and vegetables commonly grown in Fairfax County. The ground is frozen only to shallow depths during winter. Some snow falls in the winter, but it stays on the ground for only a short time. Many cover crops can be grown. Outdoor work can be performed all winter, except during a few unusually cold periods.

The grazing season is about 225 days. It begins in the middle of April and extends to the middle of November. Some well-managed pastures on fertile soils can be grazed from the first of April to the first of December.

Rainfall is generally ample for most crops, except in dry years. Most rain falls in the summer and spring. Crops planted late in wet springs are sometimes damaged by early fall frost before they mature. This occurs on some of the moderately well drained and somewhat poorly drained Calverton, Readington, Beltsville, and Iredell soils. There are no mountains in the county. Consequently, differences in the suitability of soils for crops are due to factors other than climate.

Water Supply

Springs, wells, and streams provide adequate supplies of water for domestic and livestock needs in Fairfax County. Springs occur throughout the county but, for most people, are of little importance as a source of water.

Wells are the greatest source of water on farms. The amounts of water they furnish varies considerably with the geologic formation in which they are located. In the Triassic shale and sandstone, wells from 37 to 300 feet deep can yield ½ to 45 gallons per minute. Water from these wells, however, is often hard and objectionable because of the iron in solution. Wells 25 to 110 feet deep in the diabase formation yield from 1 to 12 gallons per minute. Wells 28 to 195 feet deep in granite yield ½ to 25 gallons per minute. Wells 30 to 305 feet deep in schist can be expected to yield from ½ to 60 gallons per minute. Some deeper wells in schist have yielded 140 gallons per minute. The wells in the Coastal Plain often yield from 1 to 100 gallons per minute from depths of 13 to 530 feet (*2*). Some shallow wells in the diabase, greenstone, shale, and sandstone go dry in summer.

Supplies of surface water are plentiful. Water from this source is obtained from the Potomac River in the eastern part of the county and from Bull Run and Occoquan Creek in the southern and western parts of the county. Other permanent sources of water are the Holmes and Difficult Runs and Accotink and Pohick Creeks. The water in the smaller creeks is usually soft and of good quality if not polluted (*10*) by the effluent from septic tanks.

Vegetation

Fairfax County was originally covered entirely by forests of hardwood trees mixed with scattered Virginia pine and redcedar. Small quantities of hemlock were scattered along Occoquan Creek and Occoquan Bay in the southern part of the county. Yellow-poplar and other hardwood trees grew mostly on the lower Coastal Plain and on cool sites in the Piedmont Upland. Oaks mixed with scattered Virginia pine grew on the drier sites on the upper Coastal Plain and Piedmont Upland. Chestnut was common on the friable Manor, Glenelg, Appling, and Elioak soils in the Piedmont Upland and on the hilly, gravelly soils of the higher lying Coastal Plain. Oak, scattered pine, and redcedar were most abundant in the Piedmont Lowland. Most of the timber from pioneer clearings was rolled into piles and burned, except for the small part that was used as material for the necessary farm buildings.

About 40 percent of the county area is now in forest, which is widely distributed over the county. The largest and most continuous areas of forest are in the Coastal Plain and Piedmont Upland provinces in the southeastern part of the county. The Piedmont Lowland has the highest percentage of cleared land, and very little, if any, virgin timber remains. Most woodland consists mainly of white, red, pin, black, post, blackjack, and chestnut oaks and hickory, maple, beech, poplar, black locust, sassafras, dogwood, gum, and holly. There are a few scattered, pure stands of Virginia pine. A few patches of hemlock are in the southern part of the county along Occoquan Creek and Occoquan Bay. Chestnut sprouts growing from old tree stumps are found mainly in the Piedmont Upland. The poorest woodland is generally on the higher Coastal Plain soils that contain fragipans and on the Piedmont Lowland soils that have a fragipan and claypan, or that are shallow over hard rock.

The kind and quality of trees are an expression of the soil and moisture condition of the site. In places there is a direct correlation between the soils and the species of trees that grow in them naturally.

Pin oak grows in almost pure stands in the wet, flat, fine-textured Elbert and Croton soils of the Piedmont Lowland. Scrubby white oak, with a large percentage of blackjack and post oaks, grows on the heavy, clayey Iredell and Kelly soils in the Piedmont Lowland. Red and white oaks grow into large, tall trees on the deep, friable, well-drained Elioak, Glenelg, and Bucks soils. However, the same species are short bodied and slow growing on the shallow, droughty Penn and Catlett soils.

White and red oaks and yellow-poplar grow into the best, long-bodied trees in the county on the deep soils of the Coastal Plain. These deep soils have good moisture conditions for trees and are underlain by strata of sand. Chestnut oak or scrubby, short-bodied white, red, and post oaks grow mainly on the Beltsville soils, which have a fragipan 16 to 20 inches below the surface. Sycamore, river birch, boxelder, white elm, and willow are the most common species on the Chewacla and Wehadkee soils and on Mixed alluvial land of the flood plains.

Trees grow at different rates on the various exposures of a site. Chestnut oak grows poorly on some of the rocky and shallow soils on ridges. However, it grows tall and produces good timber on the east- and north-facing slopes and in moist coves occupied by the Meadowville, Manassas, and Glenville soils.

The understory in forests consists mainly of laurel, huckleberry, spicebush, wild grape, running cedar, azalea, greenbrier, mountain-tea, serviceberry, red-osier, redbud, sumac, and dangleberry.

The species and growth of grasses and weeds vary on the different soils according to management. Idle fields contain many plants, including broomsedge, dewberry,

blackberry, cinquefoil, hawkweed, ragweed, aster, greenbrier, sumac, orchardgrass, bluegrass, whiteclover, wild onion, beggarweed, stickweed, yarrow, oxeye daisy, sourgrass, sheep sorrel, Spanish needle, crabgrass, lespedeza, and narrowleaf plantain.

Properly managed permanent pastures generally consist mainly of bluegrass, whiteclover, and crabgrass. In addition, there usually is some redtop, orchardgrass, hawkweed, narrowleaf plantain, broomsedge, and other weeds and grasses in the mixture. Temporary pastures used in long cropping systems consist mostly of orchardgrass, but they have some fescue, ladino clover, timothy, lespedeza, and redtop. Chickweed is common in many alfalfa fields.

Descriptions of the Soils

All the soils mapped in Fairfax County are described in this section. First the soil series are described and then, very briefly, the soil types. A soil series is a group of soils that have developed from similar parent material and that have similar characteristics, except for the texture of the surface layer. The descriptions of the soil series tell about the general characteristics of the soils in the series and their relation to the soils of other series. A representative soil profile is described for each series. A soil profile is a vertical section showing all layers, or horizons, from the surface through the parent material.

Additional information about the soil series and their relationships is given in this report in the section "Classification and Morphology of the Soils," and in the publication "Chemical and Physical Properties of Fairfax County Soils" (*9*).

The mapping units in a given series have essentially the same characteristics, except for external properties and, for some units, the texture of the surface layer. The external properties include slope, erosion, and deposition of new material; these properties particularly affect management of the soils but do not affect their placement in an orderly natural classification. Hence, only a brief description is given to point out distinctive characteristics of some of the mapping units that follow the series description.

Following the name of each soil and its slope range there is a set of symbols in parentheses. These identify the soil on the detailed map in the back of the report.

The descriptions of the soils and the soil series are somewhat technical. To help the reader, a few of the commonly used terms are defined in the Glossary and are discussed in the following paragraphs.

In describing the soils, the scientist sees that the profile is made up of layers of material that may differ in color, composition, texture, and structure. He assigns a letter symbol, for example "A_1," to the various layers and determines the distance of each layer from the surface.

The letter symbols have special meaning that concern scientists and others who desire to make a special study of the soils. They are used in describing soils in the section "Classification and Morphology of the Soils." Most readers will need to remember only that all letter symbols beginning with "A" are surface soil; those beginning with "B" are subsoil; those with "C" are substratum, or parent material; and those with "D" are underlying, dissimilar material.

Unless otherwise stated, the color given is the color of the soil material when moist.

The texture of the soil refers to the content of sand, silt, and clay. It is determined by the way the soil feels when rubbed between the fingers, and it is checked by laboratory analyses. Each mapping unit is identified by a textural class name, such as fine sandy loam. This refers to the texture of the surface layer, or A horizon.

The structure is indicated by the way the individual soil particles are arranged in larger grains, or aggregates, and the amount of pore space between grains. The structure of the soil is determined by the strength, or grade; the size; and the shape of the aggregates. For example, a horizon may have "weak, fine, blocky structure." Other terms used in describing soils are defined in the Glossary.

The soils mapped, their map symbols, and the capability unit in which each soil has been placed are listed in the "Guide to Mapping Units and Capability Units" at the end of the report. The location and distribution of the mapping units are shown on the detailed soil map in the back of the report. The approximate acreage and proportionate extent of the mapping units are given in table 3. The total acreage agrees with that of the 1954 U.S. Census of Agriculture.

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Fairfax Co., Va.*

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Appling gritty loam, eroded undulating phase	1, 994	0. 8	Calverton silt loam, undulating phase	876	. 3
Appling gritty loam, eroded rolling phase	6, 897	2. 6	Calverton silt loam, nearly level phase	3, 003	1. 1
Appling gritty loam, eroded hilly phase	1, 324	. 5	Calverton loam, undulating phase	1, 367	. 5
Beltsville silt loam, undulating phase	1, 969	. 7	Catlett gravelly silt loam, undulating phase	341	. 1
Beltsville loam, undulating phase	2, 073	. 8	Catlett gravelly silt loam, eroded rolling phase	879	. 3
Bermudian silt loam	146	. 1	Catlett gravelly silt loam, eroded hilly phase	214	. 1
Birdsboro silt loam, eroded undulating phase	628	. 2	Chewacla silt loam	2, 963	1. 1
Bowmansville silt loam	326	. 1	Colfax loam, undulating phase	371	. 1
Brecknock silt loam, eroded undulating phase	1, 343	. 5	Croton silt loam	1, 523	. 6
Brecknock silt loam, eroded rolling phase	62	(1)	Elbert silt loam	1, 805	. 7
Brecknock loam, undulating phase	847	. 3	Elioak silt loam, eroded undulating phase	2, 116	. 8
Brecknock loam, eroded rolling phase	206	. 1	Elioak silt loam, eroded rolling phase	1, 259	. 5
Bremo-Orange silt loams, rolling phases	800	. 3	Elioak silt loam, severely eroded rolling phase	283	. 1
Bucks silt loam, eroded undulating phase	1, 086	. 4	Elioak silt loam, eroded hilly phase	120	(1)
Bucks loam, undulating phase	1, 381	. 5	Elkton silt loam	328	. 1

TABLE 3.—*Approximate acreage and proportionate extent of the soils mapped in Fairfax Co., Va.*—Continued

Soil	Area	Extent
	Acres	*Percent*
Enon silt loam, eroded undulating phase	241	.1
Enon silt loam, eroded rolling phase	285	.1
Fairfax silt loam, undulating phase	2,783	1.1
Fairfax silt loam, eroded rolling phase	679	.3
Fairfax loam, undulating phase	646	.2
Galestown loamy fine sand	203	.1
Glenelg silt loam, undulating phase	16,129	6.1
Glenelg silt loam, eroded rolling phase	25,810	9.8
Glenelg silt loam, severely eroded rolling phase	532	.2
Glenelg silt loam, eroded hilly phase	3,540	1.3
Glenelg silt loam, severely eroded hilly phase	151	.1
Glenville silt loam	3,913	1.5
Hilly land, loamy and gravelly sediments	1,966	.7
Huntington silt loam	132	([1])
Iredell silt loam	185	.1
Iredell-Mecklenburg silt loams, eroded undulating phases	3,146	1.2
Iredell-Mecklenburg silt loams, eroded rolling phases	269	.1
Iredell-Mecklenburg stony silt loams, eroded undulating phases	328	.1
Iredell-Mecklenburg stony silt loams, eroded rolling phases	48	([1])
Kelly silt loam, undulating phase	522	.2
Lenoir silt loam	502	.2
Lindside silt loam	159	.1
Lloyd loam, eroded undulating phase	386	.1
Louisburg coarse sandy loam, rolling phase	561	.2
Louisburg coarse sandy loam, hilly phase	3,372	1.3
Louisburg coarse sandy loam, steep phase	2,980	1.1
Lunt fine sandy loam, undulating phase	338	.1
Lunt fine sandy loam, eroded rolling phase	1,265	.5
Lunt fine sandy loam, eroded hilly phase	325	.1
Manassas silt loam	1,352	.5
Manor silt loam, rolling phase	3,439	1.3
Manor silt loam, hilly phase	9,043	3.4
Manor silt loam, eroded hilly phase	141	.1
Manor silt loam, steep phase	5,773	2.2
Marsh	607	.2
Masada gravelly loam, eroded rolling phase	458	.2
Matapeake silt loam, nearly level phase	476	.2
Matapeake silt loam, undulating phase	343	.1
Mattapex silt loam, nearly level phase	1,480	.6
Mattapex silt loam, undulating phase	169	.1
Mayodan silt loam, undulating phase	621	.2
Meadowville silt loam	4,776	1.8
Mixed alluvial land	10,881	4.1
Montalto silt loam, eroded rolling phase	205	.1
Orange silt loam, undulating phase	3,246	1.2
Penn loam, eroded undulating phase	1,567	.6
Penn loam, eroded rolling phase	558	.2
Penn loam, eroded hilly phase	123	([1])
Penn fine sandy loam, eroded undulating phase	1,254	.5
Penn fine sandy loam, eroded rolling phase	1,563	.6
Penn fine sandy loam, eroded hilly phase	238	.1
Penn silt loam, eroded undulating phase	2,754	1.0
Penn silt loam, eroded rolling phase	2,298	.9
Penn silt loam, eroded hilly phase	154	.1
Penn shaly silt loam, eroded rolling phase	408	.2
Penn shaly silt loam, eroded hilly phase	470	.2
Penn shaly silt loam, eroded steep phase	140	.1
Raritan silt loam	429	.2
Readington silt loam, undulating phase	3,609	1.4
Rocky land, rolling basic rock phase	3,256	1.2
Rocky land, hilly acidic rock phase	617	.2
Rocky land, steep acidic rock phase	615	.2
Rolling land, loamy and gravelly sediments	1,013	.4
Rowland silt loam	2,701	1.0
Sassafras fine sandy loam, nearly level phase	315	.1
Sassafras fine sandy loam, undulating phase	247	.1
Sassafras fine sandy loam, eroded rolling phase	187	.1
Steep land, loamy and gravelly sediments	3,006	1.1
Swamp	155	.1
Very rocky land, hilly acidic rock phase	346	.1
Very rocky land, rolling basic rock phase	385	.1
Wehadkee silt loam	609	.2
Wickham and Hiwassee loams, undulating phases	197	.1
Woodstown fine sandy loam, nearly level phase	334	.1
Woodstown fine sandy loam, undulating phase	231	.1
Worsham silt loam	849	.3
Mines, pits, settling basins, and water	6,066	2.3
Urban development, Ft. Belvoir, and made land	75,330	28.5
Total	264,960	100.0

[1] Less than 0.1 percent.

Appling Series

The Appling series consists of deep, well-drained, light-colored soils derived from granite and gneiss. The soils occupy the tops of narrow to moderately wide upland ridges in association with the Louisburg, Colfax, and Worsham soils. The Appling soils are similar to the Louisburg soils in origin, but they have a well-developed B horizon and are much deeper to bedrock. The Appling differs from the Cecil (not mapped in Fairfax County) in having a less red subsoil.

The Appling soils are low in fertility but respond to management.

Appling gritty loam, eroded undulating phase (2 to 7 percent) (Ao).—A profile of this soil obtained in an idle pasture is described as follows:

0 to 1 inch, dark-gray, very friable, gritty loam; weak, fine, granular structure.

1 to 7 inches, light yellowish-brown, very friable, gritty loam; weak, fine, granular structure; many grass roots.

7 to 12 inches, reddish-yellow and strong-brown, friable silt loam or heavy fine sandy clay loam; moderate, fine to medium, subangular blocky structure; a few grit-sized particles of quartz.

12 to 20 inches, yellowish-red clay loam; clay skins of reddish yellow and strong brown; moderate, fine to medium, subangular blocky structure; many small pebbles of quartz.

20 to 32 inches, yellowish-red, strong-brown, reddish-yellow, and red, friable, gritty sandy clay loam or light clay loam; weak, medium, angular blocky structure.

32 to 40 inches, mottled yellowish-red, red, strong-brown, brownish-yellow, and reddish-yellow, very friable sandy clay loam; structure similar to that of weathered rock; many flakes of mica.

Range in characteristics.—The texture of the surface layer ranges from gritty silt loam to gritty loam and sandy loam. The grit varies in amount. In some places it is absent, and in others it is as much as 25 percent of the surface layer. The texture of the subsoil ranges from fine sandy clay loam to heavy clay loam. The color of the subsoil is red to reddish yellow and strong brown. Small areas of a red soil that resemble the Cecil soils and small areas of the Vance soils that have a plastic clay subsoil are included with this mapping unit. (Neither the Cecil nor the Vance soils were mapped in Fair-

fax County.) Small areas of the Appling soils that are overlain by a mantle of Coastal Plain material are also included.

Appling gritty loam, eroded undulating phase, is very strongly to strongly acid and is moderately low in organic matter and natural fertility. Internal drainage is medium to slow. The soil has a moderately high water-holding capacity and is fairly retentive of added plant nutrients. The surface layer is moderately permeable; the subsoil above a depth of 50 inches is moderately slowly permeable. Below 50 inches, the material is generally moderately permeable. This soil is fairly easy to work and to conserve.

Use and management.—About 45 percent of Appling gritty loam, eroded undulating phase, is cutover forest, 10 percent is cropped, 10 percent is pastured, and the rest is idle and used for miscellaneous purposes. A rotation commonly used on this soil consists of a year of corn, a year of a small grain, and several years of mixed hay. Alfalfa is grown on a few farms. It grows in soil that has a high level of fertility.

If properly managed, Appling gritty loam, eroded undulating phase, is fairly productive and fairly well suited to most crops grown in the county. It is best suited to hay and small grains. Good yields require the application of large amounts of plant nutrients. Additions of manure and crop residue are especially helpful in increasing production. (Capability unit IIe–2.)

Appling gritty loam, eroded rolling phase (7 to 14 percent) (Ab).—This soil has steeper slopes and is a little shallower to bedrock than Appling gritty loam, eroded undulating phase. In addition it is more erosive and, where cleared, is slightly more eroded. Runoff is medium to rapid, and internal drainage is medium.

Use and management.—About 75 percent of this soil is in forest, 10 percent is in permanent pasture, 10 percent is idle, and 5 percent is cultivated or in miscellaneous uses.

The crops grown and management used on this phase are similar to those on the eroded undulating phase of Appling gritty loam. Mainly because of the steeper slopes, Appling gritty loam, eroded rolling phase, is better suited to small grains, hay, and pasture than to row crops. However, if management is good, row crops can be grown without depleting the soil. (Capability unit IIIe–1.)

Appling gritty loam, eroded hilly phase (14 to 25 percent) (Ac).—This soil differs from the eroded undulating and eroded rolling phases of Appling gritty loam principally in having steeper slopes. Runoff is more rapid from this phase of Appling gritty loam because of the steeper slopes, shallower depth, and less well developed profile. Where this soil grades into the Louisburg soil, it has very thin horizons and its texture is coarser. A few deep and shallow gullies have formed on a small part of this soil.

Use and management.—Most of this soil is in cutover forest. A small part has been cultivated, a few areas are idle, and some acreage is used for pasture.

Because of slopes and erosive characteristics, this soil is probably best suited to pasture or forest. (Capability unit IVe–1.)

Beltsville Series

The Beltsville series consists of light-colored, somewhat poorly drained to moderately well drained soils that have developed from Coastal Plain sand, silt, and clay. The subsoil is strong-brown silty clay loam and has a fragipan at a depth ranging from 16 to 28 inches. The soils have very gently undulating slopes, and they are mostly on wide Coastal Plain terraces. Some are on ridges of the northern Piedmont Upland.

The Beltsville soils are associated with the Lunt and the Fairfax soils of the Coastal Plain and with the Glenelg, Elioak, and Appling soils of the uplands. They resemble the Calverton soils of the Piedmont Lowland in color but have different parent material and a more distinct fragipan.

Beltsville silt loam, undulating phase (2 to 7 percent) (Bb).—A profile of this soil obtained in a cultivated area is described as follows:

0 to 7 inches, pale-yellow to yellowish-brown, very friable silt loam; weak, fine, granular structure.

7 to 17 inches, strong-brown, firm, heavy silty clay loam; moderate, medium, subangular blocky structure, but weak, platy structure in lower 2 inches.

17 to 19 inches, mottled strong-brown, yellowish-brown, reddish-yellow, and yellow, firm silty clay loam; moderate, medium, subangular blocky structure; transitional to fragipan layer.

19 to 48 inches, dark-brown loam to silt loam mottled with light gray and pale brown; massive; firm, compact pan, which breaks into indistinct, coarse plates that are 1/8 to 1 inch in thickness; pan is hard and brittle and comparatively dry most of the time; under the pan is soft, very highly micaceous quartz sericite schist similar to that under the Manor soils.

Range in characteristics.—The texture of the surface soil ranges from heavy silt loam to very fine sandy loam. The fragipan is encountered at a depth of 12 to 30 inches. The subsoil to this depth is light silty clay loam to light silty clay. In most places small quartz pebbles are present throughout the pan and on top of the pan in the lower B horizon. The pan varies in thickness from 6 to as much as 48 inches, but it is commonly about 20 inches thick. The platy structure of the fragipan is more distinct in some places than in others. The buried material under the pan consists of (1) clay, silt, sand, and gravel of the Coastal Plain, and (2) quartz sericite schist and granite gneiss of the Piedmont Upland. In places plastic and strongly plastic clay similar to that in Helena (not mapped in Fairfax County) and Iredell soils is below the pan layers. Small areas have rounded gravel on the surface. These areas are shown on the soils map by the use of gravel symbols. Small areas of the Augusta and Captina soils (neither one mapped in Fairfax County) are also included with this soil.

Beltsville silt loam, undulating phase, is very strongly to strongly acid and is low in supplies of organic matter and natural plant nutrients. It retains moisture and plant nutrients well but has a fairly low water-supplying capacity. The surface layer is moderately rapidly permeable; the subsoil moderately permeable. Runoff is medium to slow; internal drainage is very slow. The fragipan, however, is very nearly impermeable, and in wet seasons the soil above the pan soon becomes filled with water, which stays in the soil for long periods after heavy rains. Consequently, Beltsville silt loam, undulat-

ing phase, is difficult to work in wet seasons and is not so well suited to crops as the associated Fairfax soils.

Use and management.—About 80 percent of Beltsville silt loam, undulating phase, is forested, 5 percent is idle, 5 percent is cropped, and the rest is in miscellaneous uses.

Because of the fragipan and slow internal drainage, Beltsville silt loam, undulating phase, is often too wet for spring cultivation. In summer it may be dry and hard. Wetness may kill the roots of some plants and prevent the existence of bacteria that are necessary for a productive soil.

Beltsville silt loam, undulating phase, is best suited to permanent pasture and hay that consists of ladino and red clovers, fescue, and lespedeza. The soil is not suitable for alfalfa. Except in dry seasons, alfalfa dies out in a few years because of wetness, and good stands are difficult to establish. Corn and small grains can be grown successfully. The cultivation of row crops, however, is difficult in wet seasons. Beltsville silt loam, undulating phase, retains added plant nutrients, is easy to conserve, and requires a high level of fertility for the production of most crops. (Capability unit IIIw–1.)

Beltsville loam, undulating phase (2 to 7 percent) (Ba).—This soil differs from Beltsville silt loam, undulating phase, in having a coarser textured surface layer and a somewhat coarser textured subsoil. It is also slightly more susceptible to erosion, and in places shallow gullies have formed. In places the surface layer, the subsoil, and the pan contain more gravel. Runoff is medium to slow, and internal drainage is slow.

Use and management.—About 75 percent of this soil is forested, 10 percent is cropped, 5 percent is pastured, and the rest is idle or in miscellaneous uses.

The management needed is similar to that described for Beltsville silt loam, undulating phase. However, because of the coarser texture, this soil probably needs slightly heavier applications of mineral fertilizer and less lime for the production of most crops. (Capability unit IIIw–1.)

Bermudian Series

The Bermudian series consists of brown, well-drained, young soils on first bottoms in the Piedmont Lowland (Triassic). The soils are associated with the Rowland and the Bowmansville soils, which consist of the same materials but are less well drained. Most areas of Bermudian soils are small and occupy the higher positions on the flood plain, but are subject to overflow. Only one soil in this series was mapped in Fairfax County.

Bermudian silt loam (0 to 2 percent) (Bc).—A profile of this soil in a cultivated area is described as follows:

0 to 22 inches, reddish-brown, very friable silt loam; weak, fine, granular structure.

22 to 37 inches, reddish-brown, friable, heavy silt loam; moderate, medium, subangular blocky structure; numerous rounded particles of red shale near bottom of layer.

37 to 52 inches, dark reddish-brown, specked with yellow, compact, very gravelly silt loam; small black concretions; pebbles are mostly red, rounded fragments of shaly sandstone that have washed from the Piedmont Lowland; pebbles are from 1/8 to 1/2 inch in diameter and comprise about 80 percent of this horizon.

Range in characteristics.—The soil is 2 to 5 feet thick. The surface layer is brown to reddish-brown loam to heavy silt loam. The underlying layers are silt loam to silty clay loam. Near the uplands, some areas of recent colluvial material and of Manassas soils are included with the Bermudian silt loam. Sandy and gravelly bars are present near creek banks in some places. The soil is moderately well drained where it grades into the Rowland and the Bowmansville soils.

Most areas of Bermudian silt loam are medium to strongly acid, but a few areas are very strongly acid. Natural fertility and the supply of organic matter are medium to high. The water-holding capacity is high. Runoff is slow; internal drainage is medium to rapid. The surface soil is rapidly permeable, and the subsoil is moderately to moderately rapidly permeable. The soil retains added plant nutrients well and is not susceptible to erosion. It is easy to conserve and work and is productive of many crops when simple management is practiced. Floods are a hazard, and in some places they deposit fresh sediment.

Use and management.—Few areas are idle. Most of the acreage is either cropped or pastured. Permanent pastures consist mainly of bluegrass and whiteclover. Corn, hay, and some small grains are commonly grown in the cultivated areas. Short rotations are followed. Some farmers grow corn for 2 or 3 years before planting hay or a small grain. Because of gentle slopes, favorable moisture, and moderately high fertility, this soil is well suited to corn, clover, grass, and permanent types of pasture. It is not well suited to alfalfa and to some small grains because of the supply of moisture and the high level of fertility. Alfalfa soon dies out, and small grains lodge in wet seasons. Flood damage can be expected in most areas. However, the danger of overflow varies from area to area and largely determines whether an area can be cultivated successfully. Areas that are subject to frequent flooding probably should remain in permanent pasture. The others can be used for corn and hay. Aside from the control of overflow, there are few management problems. The soil can be used often for row crops. Small amounts of lime and of fertilizer that contains mostly phosphate and potash will keep the soil highly productive. However, nitrogen is needed if corn is grown continuously for many years. (Capability unit IIw–3.)

Birdsboro Series

The Birdsboro series consists of deep, well drained to moderately well drained soils on stream terraces. The parent material washed largely from soils that had developed from red sandstone and shale in the Piedmont Lowland. The Birdsboro soils are associated with Raritan soils of the stream terraces and with the Bucks, Penn, and Calverton soils of the uplands. Birdsboro soils resemble the Hiwassee soils in position and relief, but are lighter colored, contain less clay, and are not so well drained. A few areas resemble the Bucks soils of the uplands. Most areas are gently undulating and subject to slight and moderate erosion. This is an inextensive series, and most of it is along Bull Run.

Birdsboro silt loam, eroded undulating phase (2 to 7 percent) (Bd).—A profile of this soil in a cultivated area is described as follows:

0 to 7 inches, dark yellowish-brown, friable silt loam; weak, fine, granular structure.
7 to 12 inches, yellowish-red, friable silty clay loam; weak, fine to medium, subangular blocky structure; few, small, black concretions.
12 to 20 inches, yellowish-red to red, friable, heavy silty clay loam to light silty clay; weak, fine to medium, subangular blocky structure.
20 to 42 inches, yellowish-red silty clay loam faintly mottled with very pale brown, strong brown, and red; moderate, fine, subangular blocky structure.
42 to 52 inches, mottled yellowish-brown, light-gray, and yellowish-red silty clay loam; slightly compact; some concretions; shale and quartz gravelly material occurs in strata below this depth.

Range in characteristics.—In places the surface layer is darker and is brown to reddish brown; the subsoil is red to dark reddish brown. The soil is less than 25 inches deep in some places, but more than 6 feet deep in most places. The profile in the thinner areas of this Birdsboro soil resembles that of the Readington soil in color and in drainage conditions. A few fragments of red shale and rounded pebbles and cobbles are present locally but do not materially interfere with cultivation. A few areas have been moderately damaged by sheet erosion. In places the underlying, original land surface of the Penn soils is exposed. Included are small moderately well drained areas that have fragipan layers in the lower subsoil.

Birdsboro silt loam is medium to very strongly acid. It is low to medium in organic matter and in natural fertility. Runoff and internal drainage are medium. The soil is moderately susceptible to erosion. It retains added plant nutrients and needs fairly heavy applications of lime to raise the pH to a desired level for legumes. The surface layer is rapidly permeable; the subsoil is moderately to moderately slowly permeable. The water-holding capacity is high. Birdsboro silt loam is easily conserved and managed and is productive for most crops commonly grown in the county.

Use and management.—About 15 percent of Birdsboro silt loam is idle, 50 percent is cultivated, 10 percent is in permanent pasture, and 25 percent is in forest.

The crops grown and the management this soil needs are similar to those for the associated Bucks and Penn soils on uplands. The 5-year cropping system commonly used is made up of corn, small grains, and a mixture of clovers and grasses for pasture. A few farmers grow alfalfa. Some farmers use shorter cropping systems consisting of corn, small grains, and clover. Idle areas have grown up to broomsedge, dewberry and blackberry, ragweed, stickweed, yarrow, wild carrot, and smilax. Intermixed are some bluegrass, whiteclover, small Virginia pines, and scattered hardwoods.

Birdsboro silt loam, eroded undulating phase, is desirable for corn, mixed hay, and small grains. In places it is not well suited to alfalfa and to some kinds of vegetables. It responds readily to management, and good yields can be obtained by using suitable cropping systems and by applying lime, phosphate, and potash in proper amounts. Crop residue and manure should also be applied. Nitrogen may be needed for corn, small grains, and grasses, where manure and crop residue have not been used. However, nitrogen is not so badly needed on the Birdsboro silt loam, eroded undulating phase, as on the Penn, Calverton, and associated soils. The application of lime and phosphate and use of organic matter are of primary importance in any improved management program. Practices to control runoff and erosion, other than contour cultivation and the use of sod crops in rotations, are not needed. (Capability unit IIe-1.)

Bowmansville Series

The Bowmansville series consists of poorly drained, wet soils on the first bottoms of major streams in the Piedmont Lowland. The soils are mostly at the bases of adjoining upland slopes and are always subject to overflow and seepage. They consist of alluvium that has washed from areas of the Penn, Bucks, Catlett, and Brecknock soils.

The Bowmansville soils are associated with the Bermudian and the Rowland soils of the bottom lands. They resemble the Croton soils, but they differ from the Wehadkee in parent material. They contain almost no mica flakes.

Bowmansville silt loam (0 to 2 percent) (Be).—A profile of this soil in a pastured area is described as follows:

0 to 10 inches, grayish-brown, friable silt loam faintly mottled with weak red, strong brown, light gray, and yellowish brown.
10 to 25 inches, strongly mottled weak-red, pinkish-gray, strong-brown, gray, and red silty clay loam; slightly plastic to plastic.
25 to 36 inches, strongly mottled weak-red, pinkish-gray, and gray silt loam to silty clay loam soil material; slightly plastic to friable; mixed with many red, gray, and pinkish particles of sandstone and shale; many pockets of quartz gravel and sandy material; waterlogged.

Range in characteristics.—In some places a recently deposited brown layer of silt loam about 6 to 10 inches thick is on the surface. Areas of Bowmansville soils that are between the Bermudian and the Chewacla soils have less highly mottled upper horizons and are slightly better drained. Where underlain by gravel, the soil is 2 to 5 feet thick. The subsoil texture ranges from clay to sandy loam. Structure of the subsoil ranges from moderate, medium to coarse, blocky to structureless. In most places structure is weakly developed in the subsoil.

Bowmansville silt loam is medium to very strongly acid but is mostly strongly acid. It is moderate in natural fertility and contains low to medium amounts of organic matter. Runoff is very slow, and internal drainage is slow. Because of the high water table, the soil is very retentive of plant nutrients and has a fairly high water-holding capacity. Added plant nutrients may not be readily available to crops unless some of the excess water is removed by surface or subsurface drainage.

Use and management.—Most of Bowmansville silt loam is used for pasture or is idle. A small part is wooded or cultivated. This wet soil is difficult to cultivate. It has a narrow range of suitability and is not productive of many crops. It is suited to permanent pasture, but some ditching is needed to drain excess water for good pasture production. Ladino clover and fescue can be grown successfully where surface water has been drained and a high level of fertility is maintained. These plants need lime, phosphate, and potash. Ditches or terraces

near the bases of slopes that surround Bowmansville silt loam help remove some of the seepage. (Capability unit IVw–2.)

Brecknock Series

The Brecknock series consists of deep, light-colored, well drained to moderately well drained soils that have formed in the residuum of baked Triassic shale and shaly sandstone. The soils are on moderately low, wide, upland ridgetops and mild slopes in association with the Catlett, Calverton, Croton, and Kelly soils. Brecknock soils have formed from the same parent rock as the Catlett, but they are deeper to bedrock than the Catlett and have a much more highly developed profile.

Brecknock silt loam, eroded undulating phase (2 to 7 percent) (Bh).—A profile of this soil in a cutover wooded area is described as follows:

0 to 8 inches, very pale brown (dry), very friable, smooth silt loam; weak, fine, granular structure.
8 to 18 inches, pale-brown (dry), friable silt loam; weak, medium, subangular blocky structure.
18 to 25 inches, dark grayish-brown (dry), firm silty clay loam; faint surface coatings of pink, black, and strong brown; strong, medium to coarse, blocky structure.
25 to 34 inches, very dark grayish-brown, firm silty clay loam; streaks of gray and specks of strong brown; coarse, blocky structure.
34 to 46 inches, very dark grayish-brown, friable silt loam to light silty clay loam soil material; faint mottles and streaks of gray, strong brown, and yellowish brown; many particles of baked shaly sandstone in lower part.

Range of characteristics.—The color of the surface layer ranges from dark grayish brown to pale brown, but it is mostly yellowish brown and grayish brown. The texture of the surface layer ranges from gravelly silt loam to loam. Some places have outcroppings of stones and angular cobbles. The location of these outcroppings is shown on the detailed soil map by appropriate symbols. The subsoil ranges from yellowish-brown, friable silty clay loam to dark grayish-brown, faintly mottled silty clay and clay. In places thin horizons of yellowish-brown and light olive-brown, plastic clay occur immediately above the parent material. Small wet spots and areas of Catlett gravelly silt loam are included. Most cleared areas have been slightly to moderately damaged by sheet erosion, and, in places, occasional shallow gullies have formed.

Brecknock silt loam, eroded undulating phase, is very strongly to strongly acid and contains low to moderate amounts of organic matter. It is moderate to low in natural fertility. It has a moderately high water-holding capacity and is retentive of added plant nutrients. Runoff is medium, and internal drainage is medium to slow. The surface layer is moderately to rapidly permeable; the subsoil, moderately to moderately slowly permeable. The soil is fairly easy to work and conserve.

Use and management.—Most of Brecknock silt loam, eroded undulating phase, is used for crops. Of the rest, about 15 percent is pastured, 5 percent is idle, and 20 percent is in cutover forest and miscellaneous uses. A cropping system that is in general use on this soil consists of corn, a small grain, and several years of hay. Alfalfa is grown on a few farms, but this soil is not so well suited to alfalfa as the Bucks and the Glenelg soils.

Brecknock silt loam, eroded undulating phase, is fairly well suited to all crops grown in the county, but it is probably best suited to small grains and to hay crops excluding alfalfa. For high yields it needs lime to raise the pH to a desirable level and fairly heavy applications of most plant nutrients. This soil also needs large quantities of manure and crop residue, and it responds well to these amendments. (Capability unit IIe–2.)

Brecknock silt loam, eroded rolling phase (7 to 14 percent) (Bk).—This soil is similar to the eroded undulating phase of Brecknock silt loam except that it has steeper slopes, has a slightly thinner profile, and is more susceptible to erosion. Runoff is medium to rapid, and internal drainage is medium to slow. Shallow gullies have formed in some areas. In some places, the plowed layer is now partly in subsoil. Small areas that resemble the Catlett soils have been included with this soil.

Use and management.—Most of this soil is cultivated. Of the rest, about 18 percent is in permanent pasture, 5 percent is idle, and 20 percent is in cutover forest and miscellaneous uses. This soil is more difficult to work, needs better management to control erosion, and produces smaller yields than Brecknock silt loam, eroded undulating phase. More use should be made of improved cropping systems, close-growing crops, contour cultivation, and stripcropping to control soil and water losses. (Capability unit IIIe–1.)

Brecknock loam, undulating phase (2 to 7 percent) (Bf).—This soil is similar to Brecknock silt loam, eroded undulating phase, but it has been derived mostly from baked sandstone instead of baked shale. It also differs in having a loam to fine sandy loam surface layer, a fine sandy clay loam to clay loam subsoil, and more sandy parent material. It contains less gravel and is slightly more erosive on similar slopes. Internal drainage is medium, but it is slightly more rapid than in Brecknock silt loam, eroded undulating phase.

Use and management.—Most of this soil is cultivated; small parts are forested, idle, or in permanent pasture. Crops and management are similar to those described for the Brecknock silt loams. Because of its coarser texture and consequent greater loss of plant nutrients through leaching, Brecknock loam, undulating phase, needs plant nutrients more frequently than other Brecknock silt loams, but it needs lime less frequently. (Capability unit IIe–2.)

Brecknock loam, eroded rolling phase (7 to 14 percent) (Bg).—This soil is similar to Brecknock loam, undulating phase, except that it has steeper slopes, is slightly more eroded, and is generally shallower to bedrock. Runoff is medium to rapid, and internal drainage is medium. A small, slightly eroded acreage has been included with this eroded phase.

Use and management.—Most of this soil is used for crops and pasture. A small acreage is idle or forested. This soil is more difficult to work and conserve than Brecknock loam, undulating phase, and is less productive under similar management. Consequently, more use should be made of contour cultivation and stripcropping, and the cropping system should contain a greater proportion of close-growing crops. (Capability unit IIIe–1.)

Bremo-Orange Complex

Bremo-Orange silt loams, rolling phases (7 to 14 percent) (Bm).—This complex was mapped on the Piedmont Upland. The soils have developed from basic rock material, mainly greenstone. Runoff is medium to rapid. Internal drainage is medium to rapid in the Bremo soils and slow in the Orange soils.

Bremo silt loam is the most extensive soil in the complex. It is shallow, and generally there are a few loose stones and angular cobbles on the surface and in the profile. The surface layer is brown to dark-brown silt loam. In most places little or no development of subsoil has taken place, and the substratum consists of strong-brown, yellowish-red, pale-brown, olive-brown, and white greenstone material that is mixed with silt loam to silty clay loam soil material of similar color. In places that have a weakly developed subsoil, the material consists of yellowish-red, strong-brown, and red silty clay loam.

The Orange soil has a well-developed profile and an extremely plastic claypan at a depth of 18 to 24 inches. The surface layer is light yellowish brown; the subsoil is yellowish-brown, extremely plastic clay. The soil is moderately well drained. A profile of Orange silt loam, undulating phase, which has been mapped separately in Fairfax County, is described under the Orange series.

Range in characteristics.—The texture of the surface soil ranges from loam to heavy silt loam. The depth to hard rock varies from a few inches to 3 feet, and in many places it is less than 2 feet. Horizons in the parent material are very thin. In most places, they are less than 12 inches thick in the Bremo soil and less than 6 inches thick in the Orange soil. Outcroppings of bedrock and of loose, angular cobbles and stones are on many areas.

Use and management.—About three-fourths of this mapping unit is in forest; the rest is in permanent pasture or is idle. Because of shallowness and droughtiness, this complex is best suited to pasture or forest. Pastures are in fairly good condition, but they need intensive management and a complete fertilizer. (Capability unit IVe–3.)

Bucks Series

The Bucks series consists of deep, red, well-drained soils on smooth upland ridgetops and on mild slopes in the Piedmont Lowland (Triassic). The soils have formed in material that weathered from sandstone conglomerate, shaly sandstone, and siltstone. They are associated with the Penn, Manassas, Readington, Calverton, and Croton soils. The Buck soils resemble the Penn in color but have a well-developed, silty clay loam to clay subsoil and are deeper to hard rock. Most of the Penn soils have been derived from shaly sandstone and shale instead of from sandstone conglomerate.

Bucks silt loam, eroded undulating phase (2 to 7 percent) (Bo).—A profile of this soil in a cultivated area is described as follows:

0 to 7 inches, reddish-brown to brown, very friable silt loam; moderate, fine to medium, granular structure.
7 to 12 inches, yellowish-red, friable, light silty clay loam; moderate, fine to medium, subangular blocky structure.
12 to 28 inches, red to reddish-brown, friable silty clay loam; moderate to strong, medium, subangular blocky structure; a few highly weathered particles of sandstone conglomerate in lower part.
28 to 42 inches, predominantly reddish-brown mingled with red, very dark gray, purplish-red, and yellowish-brown silty clay loam soil material; soil material contains many particles of sandstone conglomerate that are similar to the soil material in color.

Range in characteristics.—The thickness of soil to hard rock ranges from 20 inches to 5 feet and is greatest in places that are underlain by sandstone conglomerate. The subsoil ranges from 6 to 30 inches in thickness, but in most places it is about 20 inches thick. The color of the surface layer is yellowish brown to dark reddish brown, and the texture of this layer ranges from loam to silty clay loam. In places, areas of soil similar to the Wadesboro soils (not mapped in Fairfax County) are included. Also included are small areas of the Penn and Readington soils that are underlain by shaly sandstone. Where Bucks silt loam, eroded undulating phase, joins the Readington and the Calverton soils and where it is underlain by shaly material, internal drainage is somewhat slower than it generally is. Small, angular pebbles and a few cobbles occur locally.

Bucks silt loam, eroded undulating phase, is very strongly to strongly acid, moderate to low in natural fertility and organic-matter content, and slightly to moderately susceptible to erosion. It has a high water-holding capacity and is retentive of added plant nutrients. Runoff and internal drainage are medium. The surface layer is moderately to rapidly permeable, and the subsoil is moderately permeable. Most of this soil is easy to work and, under fairly simple management, is productive of most crops commonly grown in the county.

Use and management.—About 80 percent of this soil is used for crops, 10 percent is in pasture, 2 percent is idle, and 8 percent is in forest or miscellaneous uses.

Cropping systems 4 to 6 years in length are in general use. The principal crops are corn, small grains, mixed hay, and alfalfa. Corn generally follows hay in the rotation, and small grains follow corn. Mixed hay consists of orchardgrass, timothy, redtop, ladino and red clovers, and lespedeza. Alfalfa usually follows corn and is grown continuously as long as the stand can be kept in good condition.

Bucks silt loam, eroded undulating phase, is well suited to most of the crops commonly grown in the county. The acid condition of the soil is one factor that limits the yields of crops. Lime, at the rate of 2 to 3 tons per acre, is needed to raise the pH to the desired level for the production of alfalfa and clover. If legumes have been grown in the cropping system or if manure has been used, the soil generally needs phosphate and perhaps potash to maintain a suitable level of productivity for most crops. (Capability unit IIe–1.)

Bucks loam, undulating phase (2 to 7 percent) (Bn).—This soil differs from Bucks silt loam, eroded undulating phase, mainly in having a coarser texture throughout the profile, a somewhat lighter color, and sandstone for its parent material. Runoff and internal drainage are medium. The permeability of this soil is fairly rapid in most places. The surface layer ranges in texture from loam to fine sandy loam; the texture of the subsoil varies from light fine sandy clay loam to clay loam.

Use and management.—Nearly all of this soil is in cultivation. The management this soil needs is similar

to that for Bucks silt loam, eroded undulating phase, except that slightly more plant nutrients should be applied at more frequent intervals to obtain the same yields. Workability, conservability, and productivity are good. The soil is well suited to vegetables. (Capability unit IIe–1.)

Calverton Series

The Calverton series consists of deep, light-colored, moderately well drained to somewhat poorly drained soils with a fragipan. The Calverton soils occupy small to comparatively large areas. They are associated with the Bucks, Penn, Readington, and Croton soils in the Piedmont Lowland (Triassic). In topographic position and drainage, the Calverton soils are between the Readington and the Croton soils. They have developed from shale and sandstone materials in depressions on upland flats, around the heads of drainageways, and along the bases of slopes. The parent material is partly residuum, but much of it is local colluvium and alluvium that washed from surrounding uplands. The Calverton soils resemble the Colfax soils but are more acid, are finer textured throughout, and have formed from different parent material.

Calverton silt loam, undulating phase (2 to 7 percent) (Cc).—A profile of this soil in a cultivated area is described as follows:

0 to 6 inches, very pale brown, very friable silt loam; weak, fine, granular structure.
6 to 15 inches, brownish-yellow, friable, light silty clay loam or heavy silt loam; moderate to strong, medium, subangular blocky structure.
15 to 17 inches, yellowish-brown, friable silty clay loam faintly mottled with very pale brown; moderate to strong, medium, subangular blocky structure.
17 to 24 inches, yellowish-brown silty clay loam distinctly mottled with strong brown and very pale brown; compact; indefinite to weak, platy structure or massive.
24 to 41 inches, distinctly mottled brown, strong-brown, yellowish-brown, and light-gray, light clay loam; compacted less than the 17- to 24-inch horizon.
41 to 47 inches, coarsely mottled, light silty clay loam with slick feel; mottles of white and reddish brown, which are similar to those in parent rock.
47 to 57 inches, reddish-brown, purplish, shaly sandstone; crushes readily under moderate pressure.

Range in characteristics.—The surface layer ranges from loam to heavy silt loam and is 5 to 15 inches thick. The subsoil above the fragipan ranges in color from brownish yellow to strong brown and in thickness from a few inches to 24 inches. The total subsoil is 14 to 26 inches thick, but in most places it is about 18 inches thick. In most places the parent material is immediately under the pan, but in some places there is a fairly thick, highly mottled horizon under the pan. This highly mottled horizon has a heavier texture than the soil above the pan, and it ranges in texture from heavy silty clay loam to clay and silty clay. Included with Calverton silt loam, undulating phase, are shallower soils that have very thin, weak, compact layers. Also included are very small areas of the Croton soils, which are shown on the detailed soil map by wet-spot symbols.

Calverton silt loam, undulating phase, is strongly to very strongly acid and low in natural fertility and organic matter. Runoff is slow, and internal drainage is slow to very slow. Because of smooth slopes and shallowness to a slowly permeable fragipan, the soil has a moderately low water-holding capacity. However, moisture is abundant after wet seasons. The soil has a moderately narrow range of moisture content during which it can be cultivated. When the soil is wet, heavy machinery mires, and when dry, the soil hardens.

Use and management.—A large part of Calverton silt loam, undulating phase, is used for crops and pasture. Of the rest, about 15 percent is in forest, and 10 percent is idle or in miscellaneous uses. The management used on this soil is similar to that used on the associated Penn, Bucks, and Readington soils. However, more farmers are now growing pasture and hay and less corn.

Because of the smooth, low relief, slow runoff, and slow internal drainage, Calverton silt loam, undulating phase, has a narrower range of suitability than the Penn and the Bucks soils. It is perhaps best suited to hay and permanent pasture, but alfalfa is not a suitable hay crop. Fair yields of corn, soybeans, and other row crops can be obtained if lime and a complete fertilizer are applied in proper amounts and suitable cropping systems are followed.

Erosion is not a problem on most areas of this soil. Some of the more nearly level, wetter areas may need to be drained by ditching or tiling if cultivated crops are to be grown on them. Pastures that include a mixture of ladino clover and fescue produce well if fertility is maintained at a high level. (Capability unit IIIw–1.)

Calverton silt loam, nearly level phase (0 to 2 percent) (Cb).—This soil is very similar to Calverton silt loam, undulating phase, except that it has smoother slopes, and, in general, is not so well drained. It contains more wet spots and is mottled higher in the profile. Runoff and internal drainage are slow to very slow. Water drains from this soil more slowly than from the undulating phase of Calverton silt loam. The fragipan is not so distinct as in the undulating phase of Calverton loam.

Use and management.—Most of this soil is used for crops and permanent pasture. Management is similar to that for Calverton silt loam, undulating phase. Because of the slow to very slow internal drainage and runoff, Calverton silt loam, nearly level phase, is better suited to permanent pasture or grass than to row crops or small grains. Ladino clover and fescue grow well where a high level of fertility is maintained. Lime, a complete fertilizer, manure, and some drainage are needed for good pasture. (Capability unit IIIw–1.)

Calverton loam, undulating phase (2 to 7 percent) (Ca).—This soil is similar to Calverton silt loam, undulating phase, except that it has a coarser texture throughout and is underlain by light-colored, fine-grained sandstone material. In some areas, this material has been baked. This soil is closely associated with the Kelly soils and with the more sandy Penn and Buck soils. The larger areas of it are south of Herndon, Va.

Use and management.—Most of this soil has been cleared and is used for crops. It needs management similar to that for Calverton silt loam, undulating phase, but it is coarser textured, easier to work, and somewhat better suited to more crops. It needs more intensive fertility management for good yields. (Capability unit IIIw–1.)

Catlett Series

The Catlett series consists of shallow, light-colored, somewhat excessively drained soils. The soils occupy smooth, upland ridgetops and gentle slopes in the Piedmont Lowland (Triassic). They developed from baked dark-gray, light-gray, and brownish shale, sandstone, and shaly sandstone from basic dikes, sills, and sheets of igneous rock. The Catlett soils are associated with the Brecknock, Croton, and Kelly soils; they adjoin the Penn, Bucks, and Iredell soils in many places. A small acreage has some shallow and deep gullies. Except for the grayish color and baked parent material, the Catlett soils resemble the Penn soils.

Catlett gravelly silt loam, undulating phase (2 to 6 percent) (Cd).—A profile of this soil in a wooded area is described as follows:

0 to 7 inches, dark-gray to pale-brown, very friable gravelly silt loam; weak, fine, granular structure; forest litter on top of this horizon is half an inch of very dark gray, partially decomposed leaves and twigs.

7 to 14 inches, gray to grayish-brown, compact but friable, silty clay loam soil material; contains many highly weathered fragments of shaly sandstone ¼ inch to 2 inches in diameter; weak, medium, subangular blocky structure.

14 inches +, highly weathered, fairly hard, dark-gray baked shale and shaly sandstone splotched with yellow and rust brown.

Range in characteristics.—The depth to hard rock is less than 24 inches in most places. The color varies with that of the underlying shale and sandstone. It ranges from gray through brown to weak red. Mingled and splotched colors are characteristic in many places. The soil is usually browner where it joins the Penn soils and is grayer along the basic dikes where it joins the Iredell soils. The texture varies from loam to silt loam. Angular cobbles, a few stones, and occasional outcroppings of rock occur locally.

Catlett gravelly silt loam, undulating phase, is naturally extremely acid to very strongly acid. It is very low in organic matter and natural fertility and low in water-holding capacity. Runoff and internal drainage are medium to rapid. The surface soil is rapidly permeable; the parent material moderately to rapidly permeable. The soil is much less retentive of plant nutrients than the associated Brecknock and Kelly soils. Workability is fair to fairly good. The retention of water and plant nutrients is fair to poor; productivity is fair to poor. The range in suitability is medium to narrow. The eroded areas included with Catlett gravelly silt loam, undulating phase, are less retentive of plant nutrients, have a very low water-holding capacity, and are poor in workability.

Use and management.—Nearly all of Catlett gravelly silt loam, undulating phase, is used for crops and pasture; a few areas are idle or wooded. Cropping systems similar to those used on the Penn and the Brecknock soils are used on this soil. They consist of corn, small grains, and mixed hay. The hay is mainly red clover, lespedeza, timothy, and some orchardgrass.

Mainly because of shallowness, low water-holding capacity, somewhat excessive drainage, and low fertility, this soil is not well suited to row crops. Small grains and mixed hay yield well if intensive management is practiced. The soil requires lime, a complete fertilizer, manure, and crop residue for high yields of crops and permanent pasture. The soil is droughty; consequently, irrigation may be feasible on some farms if large yields are to be expected. (Capability unit IIIe–2.)

Catlett gravelly silt loam, eroded rolling phase (7 to 14 percent) (Ce).—The soil is similar to Catlett gravelly silt loam, undulating phase, except that it occupies steeper slopes on narrow ridgetops and ridge crests. Runoff and internal drainage are medium to rapid. This soil is gravelly and slightly shallower and more eroded than Catlett gravelly silt loam, undulating phase.

Use and management.—About 20 percent of this soil is cultivated, 20 percent is in permanent pasture, 8 percent is idle or in miscellaneous uses, and 52 percent is in forest. The crops grown and the management practiced on this soil are similar to those on Catlett gravelly silt loam, undulating phase. Mainly because of steeper slopes, this eroded rolling phase of Catlett gravelly silt loam is not well suited to intertilled crops and is better suited to pasture or forest. However, under intensive management, small grains and mixed hay can be grown successfully in some areas. (Capability unit IVe–2.)

Catlett gravelly silt loam, eroded hilly phase (14 to 25 percent) (Cf).—This soil occupies moderately deep, dissected upland slopes near large streams in the Piedmont Lowland. It is similar to the eroded rolling and the undulating phases of Catlett gravelly silt loam except that it has steeper slopes and a thinner profile. Runoff is rapid to very rapid, and internal drainage is rapid. The hazards of erosion are high to very high. The water-holding capacity is low to very low.

Use and management.—About 60 percent of this soil is in forest; the remaining 40 percent is pastured, cultivated, or idle.

Because of steeper slopes, this soil is not so well suited to pasture as Catlett gravelly silt loam, eroded rolling phase. However, with good management, it has produced fairly good pasture on some farms. Yields are generally less than on the eroded rolling phase. Overgrazing should be avoided. The eroded and steeper slopes included in this mapping unit are best suited to forest. (Capability unit VIe–2.)

Chewacla Series

This series consists of young, fertile, somewhat poorly drained to moderately well drained soils on first bottoms that are subject to flooding. These soils have developed from fine material that washed mainly from the Piedmont Upland, which is underlain by granite gneiss, schist, and greenstone. They are associated with and occupy slightly higher elevations than the poorly drained Wehadkee soils.

The Chewacla soils resemble the Rowland soils of the Triassic area in drainage, relief, and position, but they are less reddish and have different parent material. The vegetative overstory consists mainly of willow, sycamore, elm, red birch, red maple, white oak, and boxelder. The understory consists of bluegrass, whiteclover, broomsedge, foxtail, lespedeza, plantain, stickweed, goldenrod, sedge nutgrass (*Cyperus esculentus*), horsemint, orchardgrass, fescue, aster, ragweed, milkweed, and hen-nest grass (*Donthonia spicata*).

Only one soil in the Chewacla series was mapped in Fairfax County.

Chewacla silt loam (0 to 2 percent) (Cg).—A profile of this soil in a cultivated area is described as follows:

0 to 14 inches, brown to dark-brown, very friable silt loam; moderate, fine, granular structure; roots plentiful in upper 6 to 8 inches; few, very fine flakes of mica; lower part faintly mottled.

14 to 20 inches, mottled very pale brown, pale-brown, yellowish-brown, and strong-brown, friable, heavy silt loam; moderate, fine to medium, subangular blocky structure; many, tiny, thin flakes of mica; a few black concretions.

20 to 56 inches, mottled very pale brown, light brownish-gray, strong-brown, and yellowish-brown, firm, heavy silt loam to silty clay loam; mottles are common, medium to coarse, and distinct; weak, medium to coarse, subangular blocky structure; flakes of mica and black films are common.

56 inches +, mottled, highly micaceous silt loam soil material; contains much subangular and rounded gravel from the Piedmont Upland.

Range in characteristics.—The texture of the surface layer ranges from silt loam to loam; that of the underlying layers, from silt loam to silty clay loam. Small spots of gravelly and sandy loam occur near streambanks and in old streambeds. The depth to the gravel parent material ranges from 24 inches to as much as 72 inches. Small wet spots of the Wehadkee soils are included in places, and they are usually shown on the map by wet-spot symbols. Small areas of the Meadowville soils are also included where the flood plains join upland slopes and where intermittent drainageways approach flood plains. A small acreage of Congaree silt loam (not mapped separately in Fairfax County) has been combined with this soil. In many places floods deposit fresh sandy and loamy material nearly every year.

Chewacla silt loam is medium acid in most places but ranges from strongly acid to slightly acid (pH 5.0 to 6.0). Natural fertility and the supply of organic matter are moderate to moderately high. The water-holding capacity is moderate to high. Permeability is moderate to rapid in the surface layer and slow in the subsurface layer and subsoil. Runoff and internal drainage are slow. This soil can retain added plant nutrients. However, it has only a medium to narrow range of suitability for crops and is more difficult to handle than the better drained soils that are not subject to overflow. It is not greatly affected by drought.

Use and management.—About 20 percent of Chewacla silt loam is cultivated, 60 percent is in permanent pasture, 8 percent is idle, and 12 percent is in forest.

The major crops grown on Chewacla silt loam are corn and mixed hay. Most of the crops and cropping systems are similar to those used on the adjoining upland. A few farmers grow corn for several years and then use the land for hay. Mainly because of its somewhat poor drainage and the hazard of flooding, this soil is suited best to corn, pasture, and some kinds of hay (fig. 2). It is poorly suited to small grains and alfalfa and to potatoes and many other vegetables. Under ordinary management, crop yields are less than those obtained from the Congaree soils (not mapped in Fairfax County).

On most farms Chewacla silt loam is suited best to pasture. If this soil is cropped, however, corn and hay crops other than alfalfa can be grown. Proper management should include applications of lime and a complete fertilizer. Open-ditch drainage or bedding will improve the soil for pasture in many places. If properly managed, the Chewacla soil could easily be one of the best pasture soils in the county. (Capability unit IIIw–2.)

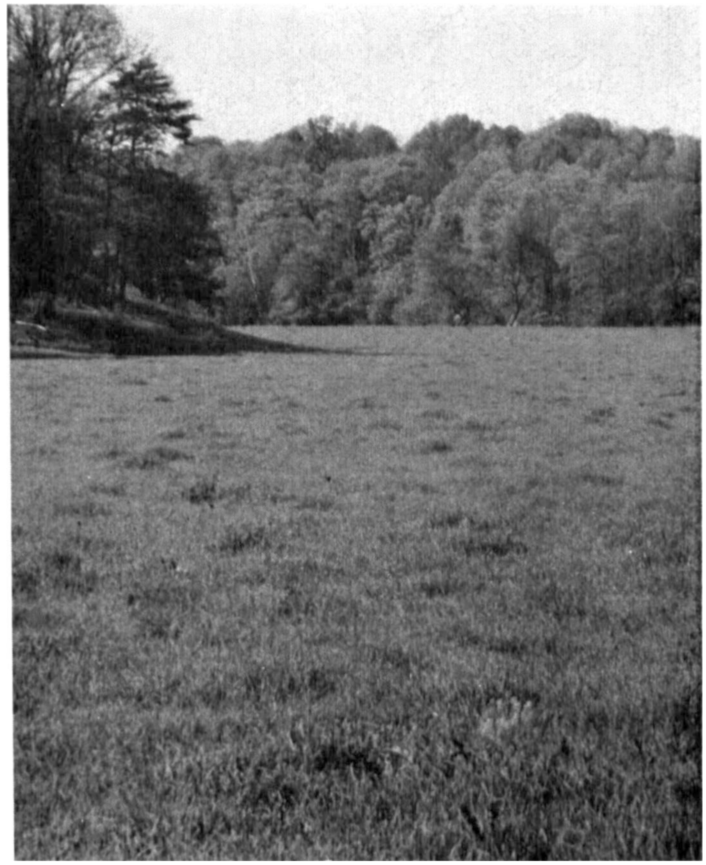

Figure 2.—**Chewacla soils on first bottoms, subject to flooding, are good for corn, pasture, and hay. Manor soils on adjoining slopes are not suitable for tillage.**

Colfax Series

The Colfax series consists of light-colored, somewhat poorly drained soils that occur near the heads of drainageways, on foot slopes, and on upland flats. They have discontinuous fragipans in the subsoil. The soils have formed from granite rock material and to some extent from material that has washed or sloughed from the Appling and Louisburg soils. The Colfax soils are associated with the Appling, Louisburg, and Worsham soils. In drainage, relief, and color, the Colfax soils are between the Worsham and Appling soils. Only one soil was mapped in this series.

Colfax loam, undulating phase (2 to 7 percent) (Ch).—A profile of this soil is described as follows:

0 to 10 inches, grayish-brown to brownish-yellow, very friable loam; few quartz pebbles on and in the soil; in wooded areas the upper 2 to 3 inches is grayish brown.

10 to 19 inches, brownish-yellow, friable sandy clay loam faintly mottled with pale brown and light gray; few small pebbles of quartz.

19 to 27 inches, predominantly yellowish-brown clay loam mottled with shades of brown and gray; firm, hard.

27 to 48 inches, highly mottled yellowish-brown, yellow, very pale yellow, and light-gray, heavy clay loam; firm, hard, plastic; many small flakes of mica and small quartz pebbles in lower part.

48 to 58 inches, mottled yellowish-brown and gray, friable, light clay loam to fine sandy loam material; contains mica and partly decomposed granite rock material.

Range in characteristics.—The texture of the surface layer ranges from silt loam to coarse sandy loam. The discontinuous fragipan is a few inches to 3 feet thick. The plastic horizon under the fragipan is absent in some places and 12 to 20 inches thick in others. In places there are small wet areas of Worsham soils, which are indicated on the soil map by symbols.

Colfax loam, undulating phase, is very strongly to strongly acid and low in supply of organic matter and essential plant nutrients. The surface layer is moderately rapidly permeable to roots, moisture, and air; the subsoil is slowly permeable. Runoff is slow to medium; internal drainage is slow to very slow.

Use and management.—Nearly all of Colfax loam, undulating phase, is in forest. The soil generally is not very desirable for crops. Clay in the subsoil hinders penetration of water and roots. In wet seasons, the layers above the fragipan soon become very wet, but they dry out quickly in short, dry periods. Water that penetrates the fragipan may never be available for plants because this dense horizon will not allow water to rise within the reach of plant roots.

This soil is difficult to cultivate and to cross with heavy farm machinery in wet seasons. Workability is fair to poor. Productivity is medium if management is good. (Capability unit IIIw–1.)

Croton Series

The Croton series consists of gray, poorly drained soils that have formed from Triassic sandstone and shale. Croton soils are on upland flats and near the heads of drainageways in the Piedmont Lowland. They are associated with the Penn, Bucks, Calverton, Manassas, Brecknock, and Catlett soils. For the most part, the Croton soils occupy the lowest positions among these associated soils. In many places seepage water flows to the Croton soils from the associated soils. The Croton soils resemble the Worsham soils of the Piedmont Upland but are shallower, are predominantly heavier in texture, and are underlain by different parent material. The natural vegetation is mainly willow, swamp, chestnut, white, and black oaks, and pine, elm, blackgum, elderberry, alder, sedge nutgrass (*C. esculentus*), and rushes and other plants that can tolerate wet conditions.

Only one soil, Croton silt loam, was mapped in this series.

Croton silt loam (0 to 2 percent) (Ck).—A profile of this soil in a cultivated area is described as follows:

0 to 9 inches, faintly mottled light-brown, gray, grayish-brown, and yellowish-brown, friable silt loam; thick, medium, platy structure that crushes to moderate, fine to medium, granular; many roots; compacted by heavy farm machinery.

9 to 16 inches, mottled pale-brown, light-gray, yellowish-brown, and light brownish-gray silty clay; mottles are many, medium, and distinct; firm, slightly plastic; strong, fine to medium, subangular blocky structure.

16 to 34 inches, distinctly mottled red, pinkish-gray, light-gray, and yellowish-red silty clay; slightly plastic and hard; moderate, medium, subangular blocky structure; few rounded pebbles of quartz.

34 to 42 inches, distinctly mottled red and gray, friable silt loam soil material; contains a high percentage of partially weathered, reddish shaly sandstone.

42 inches +, horizontally bedded, red, hard shaly sandstone.

Range in characteristics.—From 3 to 8 inches of brown to grayish-brown recent colluvial and alluvial material covers some areas of this soil, especially those along the upper drainageways. Small, somewhat poorly drained areas are included where this soil joins the Manassas, Calverton, and Penn soils. Where Croton silt loam borders the Iredell soils and where it is associated with the Brecknock and Kelly soils, there are areas that have a plastic clay subsoil similar to that in the Elbert soils. Most areas of these included soils are predominantly gray mottled with brown, but in many areas there are numerous yellowish-brown mottles throughout the entire profile, even in the part where water stands most of the time.

Croton silt loam is very strongly to strongly acid and moderate to low in natural fertility. Supplies of organic matter are medium to low. The water table and water-holding capacity are moderate to high. Runoff and internal drainage are slow to very slow. The hazard of erosion is very low. This soil is moderately permeable, but its high water table interferes with the penetration of air and roots. Some type of drainage is generally needed to improve workability and to maintain a high level of productivity.

Use and management.—About 70 percent of Croton silt loam is used for pasture, 5 percent is cropped, 15 percent is wooded, and 10 percent is idle.

Mainly because of poor natural drainage and very poor workability, Croton silt loam is better suited to pasture or forest than to cultivated crops. Corn and small grains fail on many of the small areas in which they are grown each year. Alfalfa is not suited to the soil. Ladino clover, fescue, bluegrass, White Dutch clover, and many other grasses and legumes grow well. Lime, a complete fertilizer, and some ditch drainage are needed for good pastures. Some areas probably could be used for row crops if they were improved by drainage. (Capability unit IVw–2.)

Elbert Series

The Elbert series consists of poorly drained, gray soils that are generally referred to as wet land, or crawfish land. The Elbert soils occur in widely scattered places throughout the Triassic area. They are associated with the Iredell, Mecklenburg, Kelly, and Montalto soils. The Elbert soils on upland flats have formed from material that weathered from diabase and syenite; those around the heads of draws and along drainageways, from local colluvial and alluvial materials. The native vegetation differs from that in surrounding areas and consists of water-tolerant trees, shrubs, and grasses. In color and position, the Elbert soils resemble the Croton soils of the Piedmont Lowland and the Worsham soils in the Triassic area. However, the Elbert soils have a heavier, more sticky, extremely plastic subsoil and have formed

from different parent material. Only one soil was mapped in this series.

Elbert silt loam (0 to 2 percent) (Ea).—A profile of this soil in a cultivated area is described as follows:

0 to 9 inches, light olive-brown silt loam faintly mottled with light gray; moderate, fine to medium, granular structure.
9 to 13 inches, mottled light-gray, strong-brown, yellow, and brownish-yellow clay; plastic; strong, medium, blocky structure.
13 to 29 inches, highly mottled light-gray, strong-brown, brownish-yellow, and yellowish-brown clay; extremely plastic; massive; some small black concretions and films.
29 to 39 inches, highly mottled light yellowish-brown, yellowish-brown, yellowish-red, strong-brown, and gray sandy clay; sticky, slightly plastic; moderate, medium, subangular blocky structure; this is a transitional horizon.
39 to 64 inches, brown, strong-brown, brownish-yellow, and light olive-brown, friable, coarse sandy loam from diabase rock material.

Range in characteristics.—Small areas are included that have layers of brown and black mineral concretions, 10 to 16 inches below the surface. Where Elbert silt loam is associated with the Kelly soils, it is thicker and the upper horizons are less plastic. In most places the color of the extremely plastic horizon in the subsoil is olive brown or yellowish brown. In places along drainageways, Elbert silt loam is deeper than normal, has a darker surface layer, has less plastic and less sticky subsoil, and is somewhat gravelly. A few areas of Elbert silt loam adjacent to the better drained Montalto and Mecklenburg soils are somewhat poorly drained.

Elbert silt loam is slightly to strongly acid to neutral in the upper layers but generally is slightly acid to neutral in the lower horizons and parent material. It has a low to fairly high content of organic matter, is moderate to high in natural fertility, and has a high water table and a high water-holding capacity. The surface layer is moderately to slowly permeable to roots, moisture, and air; the subsoil is very slowly permeable. Retention of plant nutrients is good. However, a high water table and a sticky, plastic subsoil cause very poor workability, very low productivity, and a very narrow range in suitability. Runoff and internal drainage are very slow. Water stands in the flat areas in wet seasons.

Use and management.—About half the acreage of Elbert silt loam is used for permanent pasture, 35 to 45 percent is wooded, and the rest is cropped. Crops are generally grown in small spots that occur in large fields composed of the better drained soils. Unless the soil has been drained, corn and most grains yield so little that the crops are seldom harvested.

Although this soil is fairly fertile, easy to conserve, and not susceptible to erosion, it is too wet for row crops unless drained. Runoff and internal drainage are very slow, and the water table is high most of the time. A few areas along drainageways are subject to flooding after hard rains. Permanent pasture is the best use for this soil. Proper management of pasture consists of adding lime, phosphate, and potash and clipping weeds, regulating the grazing, and draining the wet areas. (Capability unit Vw–1.)

Elioak Series

The Elioak series consists of deep, well-drained soils of the uplands. The surface layer is yellowish-brown to brown silt loam, and the subsoil is red silty clay loam to silty clay. The soils are in fairly large areas on undulating interstream divides and ridges. They have developed in material that has weathered from quartz sericite schist. The Elioak soils are associated with the Glenelg, Manor, Meadowville, Glenville, and Worsham soils.

Elioak silt loam, eroded undulating phase (2 to 7 percent) (Eb).—A profile of this soil in a cultivated area is described as follows:

0 to 7 inches, yellowish-brown, very friable silt loam; weak, fine, granular structure; a few fragments of quartz and schist; in wooded areas the surface is predominantly pale brown, and the upper inch is dark grayish brown; a few very small flakes of mica.
7 to 13 inches, yellowish-red, friable, light silty clay loam; moderate, fine to medium, subangular blocky structure; a few finely divided mica flakes.
13 to 32 inches, red, friable to firm silty clay loam; moderate, medium, subangular blocky structure; common to many fine mica flakes; lower part of layer is multicolored, is very friable, and is 15 to 25 percent small mica flakes; black mineral films and streaks and fragments of quartz and schist are common in many places.
32 to 60 inches, mingled and streaked with red, light reddish-brown, yellow, reddish-yellow, light-gray, and black, light silt loam; very friable; highly micaceous; weak, somewhat platy structure similar to that of the underlying schist rock; many fragments of quartz and schist.

Range in characteristics.—The surface layer is silt loam to very fine sandy loam. It is very pale brown when dry and yellowish brown to brown when wet. In cultivated areas where large amounts of organic matter have been used, the surface layer is brown and dark reddish brown. In many places small angular pebbles of quartz and fragments of schist are on and in the soil. The subsoil is silty clay loam to light silty clay. The solum is 16 to 56 inches thick; it averages about 30 inches. The parent material is generally more than 5 feet thick.

Most cultivated areas have been slightly to moderately eroded, and in places, the subsoil has been exposed in tillage. Included with this soil are very small areas of Glenelg silt loam and of a reddish-brown soil that has formed from basic rock and is similar to Montalto silt loam.

Elioak silt loam, eroded undulating phase, is very strongly to strongly acid, relatively low in organic matter, moderate to low in natural fertility, and moderately susceptible to erosion. A little more lime is needed to raise the pH of this soil to the desired level than is needed for Glenelg or Manor soils. This soil however, retains lime and fertilizer slightly longer. The permeability of the surface soil is moderately rapid, and that of the subsoil is moderate. Runoff and internal drainage are medium. The water-holding capacity is high. This soil is easy to conserve and manage and is fairly productive for most crops grown in the area.

Use and management.—About 70 percent of Elioak silt loam, eroded undulating phase, is cultivated, about 8 percent is forested, 12 percent is pastured, 5 percent is idle, and 5 percent is in miscellaneous uses.

Cropping systems 3 to 5 years in length are in general use. One of the most common systems consists of corn for silage, a small grain, and mixed hay. Another system consists of corn, a small grain, and alfalfa.

Figure 3.—**Alfalfa on Elioak silt loam, eroded undulating phase. This is one of the best soils in the county for this crop.**

The alfalfa is usually sown after the harvest of corn or small grain, and it stays on the soil for 3 to 6 years.

Elioak silt loam, eroded undulating phase, is well suited to the production of corn, small grains, and most kinds of hay. Plants that are suitable for hay are alfalfa, red and ladino clovers, lespedeza, timothy, fescue, and orchardgrass (fig. 3).

Soil acidity is one of the most important factors that limit production of crops. Enough lime should be applied to raise the pH to 6.0 or to 6.5. Shortage of nitrogen and phosphorus also limits yields in fields that have been in continuous cultivation for a long time or that have been used for alfalfa or for some special crop. The soil is normally low in fertility, but it responds well to lime, to commercial fertilizer, and to manure and crop residue. (Capability unit IIe–2.)

Elioak silt loam, eroded rolling phase (7 to 14 percent) (Ec).—This soil differs from Elioak silt loam, eroded undulating phase, in having steeper slopes and a slightly thinner profile. In addition, this soil is more susceptible to erosion. Some areas have lost considerable surface soil. Surface runoff is medium to rapid; internal drainage is medium. A few shallow gullies have formed in places. Included with this soil are small areas that have a reddish-brown to dark-brown surface layer and a red subsoil underlain by thin strata of dark-colored basic rock.

Use and management.—A large part of Elioak silt loam, eroded rolling phase, has been cleared and is used for crops or pasture. Management needs are similar to those described for the eroded undulating phase of Elioak silt loam, but more care is required to control erosion. Cropping systems should be longer, and more use should be made of sod-farming crops. Row crops ought to be grown in strips, or cultivated along the contour, or both.

Elioak silt loam, eroded rolling phase, responds well to management. Yields are only slightly less than from the eroded undulating phase of Elioak silt loam. If used for pasture, Elioak silt loam, eroded rolling phase, is easily conserved and kept productive. (Capability unit IIIe–1.)

Elioak silt loam, severely eroded rolling phase (4 to 14 percent) (Ed).—This soil differs from Elioak silt loam, eroded undulating phase, mainly in having lost most of its surface soil and a part of its subsoil through erosion. It differs from Elioak silt loam, eroded undulating phase, in having stronger slopes. The other characteristics and conditions are very similar to those described for the eroded undulating phase of Elioak silt loam.

Use and management.—A large part of Elioak silt loam, severely eroded rolling phase, is cropped and pastured. The management this soil needs is similar to that described for the eroded undulating and eroded rolling phases of Elioak silt loam.

Because of stronger slopes, this soil is not so well suited to most crops as the eroded undulating phase of Elioak silt loam. Because of erosion, it is less suited to farming than the eroded rolling phase. Some of the more severely eroded and steep areas may be better suited to pasture than to row crops. (Capability unit IVe–1.)

Elioak silt loam, eroded hilly phase (14 to 25 percent) (Ee).—This soil is similar to Elioak silt loam, eroded rolling and eroded undulating phases, except that it is steeper and more shallow. It is also more erosive than the eroded undulating and eroded rolling phases, and many areas have lost most of their surface soil. A few shallow gullies have formed in places. However, a large part of the eroded hilly phase is underlain by rocks that contain dark minerals. Runoff is rapid and internal drainage is medium. Areas similar to the Montalto soils, but which have a brown surface soil and a reddish-brown, thin subsoil that overlies basic rock material, are included with this mapping unit.

Use and management.—A large part of Elioak silt loam, eroded hilly phase, has been cleared and is used for pasture and hay. The pasture management commonly used by farmers consists mainly of occasional clipping, liming, light fertilization, and topdressing the more eroded areas with manure. When used for crops, the soil should be managed as described for the eroded rolling phase, except that some places need more manure and a higher percentage of sod crops in the cropping system.

Because of the strong slopes and great susceptibility to erosion, this soil is difficult to work and conserve, and it has a narrow range of suitability. It is best suited to permanent pasture or forest. If it is used for small grain, hay, and row crops, special management practices to help control the losses of soil and water are needed. Yields of most crops are lower than on the eroded undulating and eroded rolling phases of Elioak silt loam. This eroded hilly phase responds well to management and, if used for permanent pasture, can be easily conserved and kept highly productive. (Capability unit IVe–1.)

Elkton Series

The Elkton series consists of gray, nearly level, poorly drained soils. The soils have formed in fine Coastal Plain sediment and under deciduous forests. The Elkton soils are associated with the Lenoir soils but are not so extensive.

Elkton silt loam (0 to 2 percent) (Ef).—A profile of this soil in a forested area is described as follows:

0 to 2 inches, grayish-brown to dark grayish-brown silt loam; very friable; weak, fine, granular structure; many small roots; upper ½ inch is partly decomposed leaves and twigs.
2 to 12 inches, mottled gray and light-gray, friable silt loam; weak, fine, subangular structure; roots plentiful.
12 to 40 inches, gray, plastic clay; faintly mottled with yellowish brown and light olive brown; moderate, medium to coarse, blocky structure; few medium and large roots.
40 to 41 inches, predominately light olive-gray sandy clay to sandy clay loam faintly mottled with shades of yellow and brown; moderate, medium to coarse, angular blocky structure.
41 to 48 inches, mottled gray, yellowish-brown, and olive-brown, friable fine sandy loam; a few shiny flakes of mica; more sandy with increase in depth.

Range in characteristics.—In cultivated areas the surface layer is grayish brown or light brownish gray when moist and almost white when dry. The texture of the surface layer in places is very fine sandy loam and loam. A few areas having a clay loam subsoil have been included.

Elkton silt loam is low in organic matter and strongly acid throughout. It has a moderately permeable surface layer and a slowly to very slowly permeable subsoil. Workability is very poor. Productivity is low, but conservability is excellent. Runoff is slow to very slow; internal drainage is very slow.

Use and management.—Elkton silt loam is practically all in forest, the use for which it is best suited. If it is cleared for cultivation or pasture, the soil needs to be drained. After it is drained, it is suited to corn, oats, and improved pasture. (Capability unit IIIw–3.)

Enon Series

The Enon series consists of deep, well drained to moderately well drained, light-colored soils of the Piedmont Upland. The soils have developed from materials that weathered from mixed basic and acidic rocks, chiefly greenstone and micaceous schist. The underlying rocks are called metabasalt in the geologic survey report of the county (*5*).

The Enon soils are associated with the well drained Lloyd soils and the moderately well drained Orange soils. The Enon soils occupy positions transitional between the Glenelg, Elioak, and Manor soils, which have formed from acidic rocks, and between the Orange and Lloyd soils, which have formed from basic rocks. The Enon soils resemble the associated Glenelg soils in color but are slightly lighter colored and have a much finer textured subsoil.

In Fairfax County the Enon soils are not as well developed and contain more micaceous material than in other counties. Further studies since field mapping was completed have shown that these soils have a number of characteristics of the Fluvanna series.

Enon silt loam, eroded undulating phase (2 to 7 percent) (Eg).—A profile of this soil in a cultivated field is described as follows:

0 to 6 inches, dark yellowish-brown, very friable silt loam; weak, fine, granular structure; many grass roots; a few small angular pebbles of quartz.
6 to 9 inches, strong-brown, friable silty clay loam; moderate, medium, subangular blocky structure; few small grass roots; few quartz pebbles.
9 to 20 inches, dominantly strong-brown to yellowish-red clay to silty clay; friable to firm, plastic; moderate, medium to coarse, subangular blocky structure; peds have very thin coatings of clay that are slightly lighter in color than the peds; few small grass roots; few quartz pebbles.
20 to 32 inches, dominantly strong-brown, light silty clay mottled with yellowish red, reddish yellow, and yellow; friable, slightly plastic; weak, fine to medium, subangular blocky structure.
32 to 42 inches, mottled yellow, brownish-yellow, red, strong-brown, pale-brown, and light-gray silt loam soil material; contains fragments of partially weathered basic and acidic schist and greenstone; few small quartz pebbles; few black mineral films and concretions.

Range in characteristics.—The texture of the surface layer may be a loam, silt loam, or silty clay loam. The texture and consistence of the subsoil range from friable, light silty clay to plastic clay. In places the soil contains small flakes of mica and resembles the Glenelg soils. In other places it grades toward and resembles the more plastic Orange soils. Much quartz gravel is on and in the soil in some places. Depth from the surface to hard rock ranges from 3 feet to 8 feet, but in most places it is less than 6 feet.

Enon silt loam, eroded undulating phase, is medium to strongly acid. It is less acid than the associated Glenelg soils and more acid than the Orange soils. It is low to moderate in natural fertility and is fairly low in organic matter. The water-holding capacity is high. Runoff is medium, and internal drainage is medium to slow. The erosion hazard is slight to moderate. The permeability to roots, water, and air is rapid in the surface layer and moderate to moderately slow in the subsoil. Except for the hilly and the more seriously eroded areas, this soil is well suited to most crops grown in the county.

Use and management.—Most of the acreage is idle or used for permanent pasture. The soil is best suited to corn, small grains, and hay. Mainly because of the plastic subsoil and silt loam surface layer, the soil is not so well suited to vegetables as the more sandy soils. Lime and a complete fertilizer that contains principally potash and phosphate are needed to keep the soil productive for most crops. Occasional applications of fertilizer should be adequate for good yields, chiefly because of the fairly heavy surface layer and subsoil. Most of this soil is low in fertility and in many places needs organic matter and nitrogen fertilizer. (Capability unit IIe–1.)

Enon silt loam, eroded rolling phase (7 to 15 percent) (Eh).—This soil has formed from parent material that is similar to that of Enon silt loam, eroded undulating phase. It differs in slope, in the thickness of remaining surface soil, and in depth of the profile. Runoff is medium to rapid, and internal drainage is medium to slow. Erosion hazards are moderately high. A small hilly acreage has been included with this soil.

Use and management.—Most of this soil is idle; some areas are in forest, crops, and pasture. Mainly because

of the steep slopes and slightly more severe erosion in some places, this soil is better suited to close-growing crops, permanent pasture, or forest than to row crops. A complete fertilizer, organic matter, moderate applications of lime, and intensive management are needed to keep this soil highly productive. (Capability unit IIIe–1.)

Fairfax Series

The Fairfax series consists of well drained to moderately well drained soils that have formed in thin-bedded sand, silt, and clay fluvial material of the Coastal Plain. This material is underlain by the residuum from granite, gneiss, and schist. The Fairfax soils are on high, moderately wide, undulating ridges.

Evidence indicates that the Glenelg, Elioak, and Appling soils were formed from the underlying gneiss and schist material before the Coastal Plain or fluvial materials were deposited. The lower layers of the Fairfax soils in most places represent the buried profiles of the Glenelg, Elioak, or Appling soils.

The Fairfax soils are associated with the Appling, Glenelg, and Elioak soils of the residual uplands and with the Beltsville soils of the high Coastal Plain terraces. They resemble the Appling and Glenelg soils but are finer in texture and have slightly lighter and duller colors in the solum.

Fairfax silt loam, undulating phase (2 to 7 percent) (Fb).—A profile of this soil in a wooded area is described as follows:

0 to 1 inch, grayish-brown, very friable, light silt loam; weak, very fine, granular structure; upper ¼ inch is partly decomposed forest litter, mainly oak leaves and twigs.

1 to 7 inches, yellowish-brown to brownish-yellow, very friable silt loam; weak, thin, platy structure crushes easily to weak, fine, subangular blocky; few small pebbles of quartz on surface.

7 to 10 inches, yellowish-brown, friable, light silty clay loam; weak, fine to medium, subangular blocky structure.

10 to 19 inches, strong-brown or yellowish-brown silty clay loam; moderate, medium, subangular blocky structure; few angular pebbles and cobbles of quartz.

19 to 25 inches, mottled yellowish-brown, brownish-yellow, yellow, light-gray, and white, light silty clay loam to heavy silt loam; slightly compact; moderate, medium, subangular blocky structure; much angular quartz gravel in the lower part.

25 to 40 inches, mixed yellowish-brown, yellowish-red, pale-brown, yellow, and red, firm clay loam; moderate to strong, fine, subangular blocky structure; very similar to main subsoil in the Appling soils.

40 to 48 inches, mottled yellowish-brown, yellowish-red, brownish-yellow, reddish-yellow, and white, sticky clay loam; mottles like those in parent material; layer similar to lower subsoil in the Appling soils.

48 to 56 inches, red, strong-brown, yellowish-red, pinkish-red, and white, very friable granite gneiss material; much small quartz gravel and many slick flakes of mica; this is the parent material of the buried Appling soil.

Range in characteristics.—Many very small areas of the Beltsville, Appling, and Glenelg soils are included with this soil. The buried profile of Appling or other soil is 6 inches to several feet below the surface. In most places, however, it is at a depth of about 26 inches. The surface layer of the Fairfax soil may be silt loam, loam, fine sandy loam, or gravelly silt loam, and it is 6 to 12 inches thick. In places quartz pebbles and cobbles are on and in this layer. The subsoil ranges in texture from silty clay loam to clay, in consistence from friable to firm, and in color from yellowish brown to yellowish red. The lower part of the subsoil in this soil and nearly all Fairfax soils has a stone line consisting of subangular quartz and quartzite gravel. This stone line occurs where the fluvial material was deposited on the old land surface of the Glenelg, Elioak, and Appling soils.

Fairfax silt loam, undulating phase, is extremely acid to strongly acid and is moderately low in natural fertility and organic matter. Runoff is medium; internal drainage is medium to slow. The hazard of erosion is slight to moderate. The surface layer is moderately rapidly permeable, and the subsoil is moderately to moderately slowly permeable. The water-holding capacity is moderate. The soil is easy to conserve and manage and is moderately productive of most crops grown in the county.

Use and management.—Approximately 75 percent of the Fairfax silt loam, undulating phase, is in forest, 8 percent is idle, 10 percent is in crops and pasture, and 7 percent is in miscellaneous uses. The wooded areas have been cut over and consist mainly of oak, hickory, red maple, dogwood, and Virginia pine.

The management practiced on cropland and permanent pasture is similar to that on the Glenelg, Elioak, and Appling soils. Yields of most crops, however, are less than on the latter soils. Corn, sorghum, small grains, soybeans, cowpeas, many market vegetables, and most kinds of hay are well suited to this soil. Alfalfa can be grown, but it generally is not suited because of medium to slow internal drainage. It dies out more readily on this soil than on the Glenelg and Elioak soils. Lime and a complete fertilizer consisting mostly of phosphate and potash are needed. The soil responds readily to manure and crop residue. (Capability unit IIe–3.)

Fairfax silt loam, eroded rolling phase (7 to 14 percent) (Fc).—This soil is similar to Fairfax silt loam, undulating phase, except that it has steeper slopes, less profile depth, and slightly more erosion. The hazard of erosion is higher because the overlying mantle is 6 to 15 inches thinner than in Fairfax silt loam, undulating phase. Most slopes have gradients of about 10 percent. Runoff is medium to rapid; internal drainage is medium to slow. A few areas having many shallow and deep gullies are included.

Use and management.—Nearly all this soil is wooded or idle. Because of steep slopes and erosion, this soil is not so well suited to intensive use as Fairfax silt loam, undulating phase. It is probably best suited to small grains and permanent pasture, but not to alfalfa. This soil needs slightly heavier applications of a complete fertilizer, lime, and organic matter than are needed on Fairfax silt loam, undulating phase. The mantle of material from which this soil has formed is thinner than that of the undulating phase of Fairfax silt loam. Therefore, it is easier to dig through this slowly permeable material into the underlying schist and granitic material. (Capability unit IIIe–1.)

Fairfax loam, undulating phase (2 to 7 percent) (Fa).—This soil is similar to Fairfax silt loam, undulating phase, except that it has a slightly coarser textured surface layer and subsoil. It generally overlies old land

surfaces of the Appling or Cecil soils instead of those of the Glenelg and Elioak soils. (The Cecil soils were not mapped in Fairfax County.) Runoff is medium. Internal drainage is medium to slow and is slightly slower than in areas that overlie the old Glenelg and Elioak land surfaces. In addition, the stone line is thicker and there is considerably more subangular gravel on and in the soil than where the Fairfax soils overlie the Glenelg and Elioak soils.

Use and management.—Most of this soil is in forest; a small acreage is in pasture and crops or is idle. The management this soil needs is very similar to that for the undulating phase of Fairfax silt loam. The loam texture makes this soil easier to till and work than Fairfax silt loam, undulating phase, but the leaching of plant nutrients from the surface layer is slightly more rapid. (Capability unit IIe–3.)

Galestown Series

The Galestown series consists of deep, excessively drained, coarse-textured, sandy soils that have formed in very sandy marine deposits. These soils occur chiefly near Gunston Cove in the lower Coastal Plain in association with the Sassafras and Woodstown soils. They resemble the Sassafras soils in relief but are paler in color and coarser in texture throughout. They are extremely droughty because of the coarse texture and rapid internal drainage. Only one soil was mapped in this series.

Galestown loamy fine sand (0 to 2 percent) (Ga).—A profile of this soil in a cutover forest is described as follows:

0 to 8 inches, brown, loose loamy fine sand; few small roots; the upper ¼ inch contains dark grayish-brown loamy sand.
8 to 52 inches, strong-brown, loose loamy fine sand; structureless; contains some discontinuous iron pans and iron concretions.
52 to 62 inches, predominantly brownish-yellow, loose loamy fine sand; faint mottles of pale brown, yellow, strong brown, and pale yellow; discontinuous iron pans and concretions common in places; few, small, rounded pebbles.

Range in characteristics.—The subsoil ranges in color from strong brown to pale yellow. Some areas have a sandy loam subsoil below a depth of 30 inches. The remnants of iron pans and iron concretions are encountered in some places, but in many areas they are absent. A few, small, slight depressions have received some deposition, and in these the brown surface layer is thicker.

Galestown loamy fine sand is strongly to very strongly acid and low in natural fertility and organic matter. Runoff is slow; internal drainage is very rapid. Permeability is very rapid, and the water-holding capacity is very low. The soil is easy to work and conserve but is low in productivity for most crops except some vegetables.

Use and management.—About 80 percent of this soil is in cutover forest, 10 percent is in crops, and 10 percent is idle or in miscellaneous uses.

Because it is very sandy and droughty, this soil is best used for vegetables. It needs water and organic matter for most crops. In most seasons irrigation is needed for high yields. Green-manure crops, lime, a complete fertilizer, and a side dressing of nitrogen are also essential for obtaining good yields of most crops. (Capability unit IIIs–1.)

Glenelg Series

The Glenelg series consists of moderately deep, well-drained soils that have formed in the residuum of quartz sericite schist. The Glenelg soils occupy fairly wide, undulating to rolling interstream divides and are among the more extensive soils of the upland. They are associated with the Elioak and Manor soils, which have formed from the same kind of parent rock, and with the Meadowville and Worsham soils. The Glenelg soils differ from the Elioak soils in containing more mica, in having a thinner profile, and in having less clay and less red coloring in the subsoil. The Glenelg soils have a better developed profile than the associated Manor soils.

Glenelg silt loam, undulating phase (2 to 7 percent) (Gb).—A profile of this soil in a cultivated field is described as follows:

0 to 7 inches, brown to yellowish-brown, very friable silt loam; weak to moderate, fine, granular structure; few very fine flakes of mica; few small quartz pebbles; in wooded areas the surface layer is lighter in color except in upper 1 inch.
7 to 18 inches, yellowish-red, friable silty clay loam; strong, medium, subangular blocky structure; small flakes of mica and small pebbles of quartz are common; upper 2 inches slightly lighter in color and coarser in texture.
18 to 24 inches, strong-brown, friable to very friable silt loam; moderate, fine to medium, subangular blocky structure; numerous pebbles of quartz, particles of sand, and many fine flakes of mica, all of which are more numerous in the lower part.
24 to 36 inches, light reddish-brown, mixed with reddish-yellow and black, quartz sericite schist material; highly micaceous; very friable, soft; some fine to medium quartz gravel and partly decomposed schist rock mixed with soil material; material is deeply weathered and varies greatly in color from place to place.

Range in characteristics.—The surface layer ranges from yellowish brown to dark brown in cultivated areas and from very pale brown to dark grayish brown in wooded areas. The subsoil is predominantly strong brown to yellowish red, and it is generally lighter colored in wooded areas. The thickness of the subsoil ranges from 10 to 20 inches. In places quartz pebbles and angular cobbles on and in the soil are numerous enough to interfere greatly with tillage. Very small areas of the Elioak and Manor soils and of reddish-brown soils similar to the Myersville soils (not mapped in Fairfax County) that have formed from more basic rock material are included with Glenelg silt loam, undulating phase. Small areas that have a loam surface layer are also included. In addition, a small acreage of Manor silt loam, undulating phase (not mapped separately in Fairfax County), has been included with this soil.

Nearly all the acreage, particularly that in cultivation, has lost small to moderate amounts of soil through sheet erosion, and in places the subsoil is exposed. However, Glenelg silt loam, undulating phase, has lost less surface soil than the Elioak and Manor soils. This soil is very strongly to strongly acid, contains a fairly small amount of organic matter, is moderate to low in natural fertility, and is fairly susceptible to erosion.

This soil is relatively high in potassium and is fairly retentive of added plant nutrients. It is not so retentive as the Elioak soils but is more retentive than the Manor soils. Less lime is needed to raise its pH to a given level than is needed for the Elioak soils. The permeability of the surface soil is rapid; that of the subsoil is moderate to moderately rapid. The water-holding capacity is moderate.

Use and management.—Glenelg silt loam, undulating phase, is used mostly for crops and pasture (fig. 4). A small acreage is idle, and much of the soil is in forest.

Figure 4.—Idle field of Glenelg silt loam, undulating phase, a soil well suited to farming or residential development.

The management of this soil is similar to that used for the Elioak soils, and for most crops the expected yields are similar. Glenelg silt loam, undulating phase, is easier to work and conserve than either the Elioak or the Manor soils. If management is good, the soil is productive of most crops grown in the county; it is probably the most productive upland soil in the county (fig. 5). (Capability unit IIe–2.)

Glenelg silt loam, eroded rolling phase (7 to 14 percent) (Gc).—This soil is similar to Glenelg silt loam, undulating phase, except that it has stronger slopes and occurs on narrow rolling ridgetops and on side slopes that extend from smooth ridgetops. It also has a thinner profile in most places and is more susceptible to erosion than the undulating phase of Glenelg silt loam. Also, some areas have lost considerable surface soil. In places a few shallow gullies and occasional deep gullies have formed. Surface runoff is medium to rapid, internal drainage is medium. Included with this soil are areas similar to those described for Glenelg silt loam, undulating phase.

Use and management.—About 40 percent of Glenelg silt loam, eroded rolling phase, is in crops and pasture, 10 percent is idle, and 50 percent is in forest or miscellaneous uses.

The management of this soil is similar to that used on Glenelg silt loam, undulating phase, except that a few areas have been stripcropped, and other areas have been used mainly for hay. Mainly because of the steeper slopes, this eroded rolling phase of Glenelg silt loam has a narrower range of suitability for crops than Glenelg silt loam, undulating phase. Under similar management, the yields of most crops are slightly lower.

Glenelg silt loam, eroded rolling phase, responds readily to good management, but it is not so easily worked and conserved as the smoother Glenelg soils. It should be protected from erosion through cultivation on the contour, the use of more sod crops and longer rotations, and perhaps some stripcropping on the longer slopes, especially if row crops are grown. Glenelg silt loam, eroded rolling phase, responds well to management, has a medium range of suitability for crops, and is less productive of most crops than the undulating phase of Glenelg silt loam. (Capability unit IIIe–1.)

Glenelg silt loam, severely eroded rolling phase (7 to 14 percent) (Gd).—This soil is similar to Glenelg silt loam, eroded rolling phase, except that it is severely eroded. Nearly all the surface layer and a small part of the subsoil have been lost, and in places a few deep gullies and many shallow gullies have formed. Mainly because of its eroded condition, Glenelg silt loam, severely eroded rolling phase, has more rapid runoff, a lower water-holding capacity, and a narrower range of suitability for crops than either the eroded rolling or the undulating phase of Glenelg silt loam. Workability, conservability, and productivity are less favorable than on the noneroded phases of Glenelg silt loam.

Use and management.—A small acreage of Glenelg silt loam, eroded rolling phase, is used for crops, but

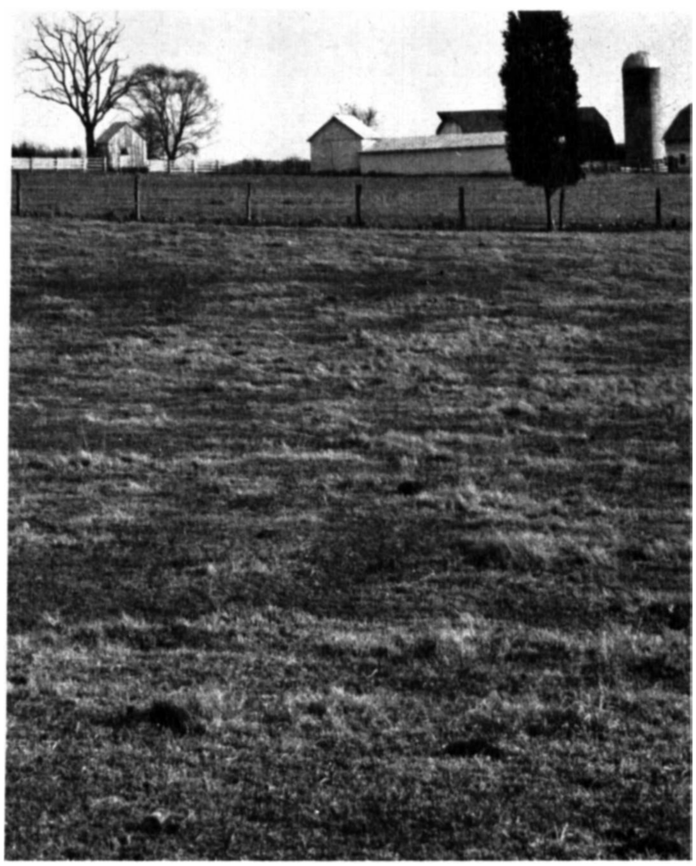

Figure 5.—Glenelg silt loam, undulating phase. Some of the best dairy farms are on this soil.

most of it is, in about equal parts, idle or used for pasture or forest. The management of this soil is similar to that used on the undulating and eroded rolling phases of Glenelg silt loam, except that, in general, more manure is applied to this severely eroded rolling phase. Except in deeply gullied areas, the management described for Glenelg silt loam, eroded rolling phase, should be good for this phase. The most severely eroded and gullied areas, however, are probably best suited to permanent pasture. Yields of most crops are slightly less than on the eroded rolling phase of Glenelg silt loam, but the soil responds well to management, especially to heavy applications of manure. (Capability unit IVe–1.)

Glenelg silt loam, eroded hilly phase (14 to 25 percent) (Ge).—This soil is similar to Glenelg silt loam, eroded rolling phase, and Glenelg silt loam, undulating phase, except that it has steeper slopes, is shallower to bedrock, and has a slightly thinner profile. Most areas have fairly thin, slightly coarse textured subsoil. In some places very small areas of the Manor soils have been included. Runoff is rapid; internal drainage is medium. The soil is naturally somewhat excessively drained. Small areas of reddish-brown, friable soils that have been formed from a more basic rock are included with this soil.

Use and management.—Glenelg silt loam, eroded hilly phase, is mostly in forest. Some of it is idle, a few areas are in crops, and a fairly large part is in permanent pasture.

The management used on permanent pasture includes mainly close grazing, clipping, moderately heavy fertilization, liming, and topdressing the more eroded or thinner areas with manure. Where this soil is used for crops, management is similar to that used on Glenelg silt loam, eroded rolling phase, except that longer rotations and more sod crops and stripcropping are used.

Mainly because of the steep slopes, this soil is very susceptible to erosion, is difficult to work and conserve, and has a narrow range of suitability for crops. Under similar management, yields of most crops are lower than from the undulating and eroded rolling phases of Glenelg silt loam. Glenelg silt loam, eroded hilly phase, is best suited to permanent pasture or forest. Pastures respond well to good management, and the soil is easily conserved and kept productive. (Capability unit IVe–1.)

Glenelg silt loam, severely eroded hilly phase (14 to 25 percent) (Gf).—This soil is similar to Glenelg silt loam, eroded hilly phase, except that it has lost most of its surface layer through erosion. Shallow gullies and a few deep gullies have formed in some areas. This soil has more runoff and is more droughty than Glenelg silt loam, undulating phase.

Use and management.—Glenelg silt loam, severely eroded hilly phase, is mostly in forest. Some of the acreage is used for pasture, a small part is idle, and the rest is used for crops. Because of the strong slopes and severe erosion, this soil probably is suited best to permanent pasture. It is difficult to work and conserve if used for row crops. However, it responds well to management, is easily conserved, and can be improved if used for permanent pasture. (Capability unit VIe–1.)

Glenville Series

The Glenville series consists of light-colored, moderately well drained to somewhat poorly drained soils that occupy depressions on foot slopes and at the heads of drainageways. These soils have formed in local alluvium and colluvium that washed from the adjacent upland. They are associated with the Glenelg, Elioak, Manor, Meadowville, and Worsham soils and in position and drainage are intermediate between the Meadowville and Worsham soils. Few slopes exceed 5 percent.

Glenville silt loam (2 to 7 percent) (Gg).—A profile of this soil in a cultivated field is described as follows:

0 to 8 inches, yellowish-brown, very friable silt loam; weak, fine, granular structure; many grass and weed roots.
8 to 18 inches, reddish-yellow, friable, light silty clay loam; moderate, medium to coarse, subangular blocky structure.
18 to 50 inches, predominately light-gray, slick, heavy silt loam to silty clay loam mottled with brownish yellow and yellowish brown; friable; moderate to strong, medium and coarse, subangular blocky structure; many finely divided mica flakes and a few small quartz pebbles.
50 to 60 inches, mottled brownish-yellow, yellowish-brown, light-gray, and white, slick, heavy silt loam; very friable; highly micaceous; weak, platy to weak, fine and medium, subangular blocky structure; a few small pebbles of quartz and particles of coarse sand.

Range in characteristics.—The surface layer ranges from 6 to 20 inches in thickness and from loam to silt loam in texture. It is mostly silt loam. In places the subsoil and parent material are highly micaceous. The solum ranges from 24 to 60 inches in thickness, but in most places is about 50 inches thick. The soil is predominantly somewhat poorly drained, but included with it are small areas of moderately well drained soils that are similar to the Meadowville soils and small areas of poorly drained soils that are similar to the Worsham soils. In some places along deep, narrow drainageways adjacent to first bottoms, small areas are included that resemble the Chewacla soils. A few pebbles and stones of quartz are in some areas.

Glenville silt loam is strongly acid, moderately low in organic matter, and fairly low in natural fertility. Runoff is fairly slow; internal drainage is slow. The water-holding capacity is moderate to high. The surface layer is moderately rapidly permeable; the subsoil, slowly permeable. Glenville silt loam is retentive of plant nutrients and is easy to conserve. Because it occupies depressions, erosion is not a problem. Some places are covered by fresh material that washed from surrounding slopes.

The water table is in the lower part of the soil. In some areas water stands on the surface a fairly long time after rains. Ditch or tile drainage is needed in many areas if row crops are to be grown. This soil has a narrower range of moisture conditions under which it can be cultivated than have Meadowville or Glenelg soils. In addition, it is not suited to so wide a variety of crops as the Meadowville or Glenelg soils.

Use and management.—About 13 percent of Glenville silt loam is in crops, 25 percent is in pasture, 5 percent is idle, and 50 percent is in forest. The rest is in miscellaneous uses.

Except for using a little ditch drainage, this soil is managed like the Glenelg and Meadowville soils. Crops

grown under the same kind of management generally yield much less on this soil than on the Meadowville and Glenelg soils. Permanent pastures consist mainly of bluegrass, whiteclover, and wild grasses and weeds. The management pastures ordinarily receive includes close grazing, light applications of manure, lime, and fertilizer, and some clipping of undesirable grasses and weeds.

Glenville silt loam is not suited well to alfalfa and other deep-rooted crops. It is best suited to hay crops other than alfalfa, especially ladino clover and fescue, and to permanent pasture. Red and alsike clovers, lespedeza, timothy, and orchardgrass produce fairly well in most areas. If corn and small grains are grown, some drainage is needed to assure profitable yields. Lime, phosphate, and potash are needed to maintain productivity. Nitrogen may also be needed if legumes have not been grown and manure or crop residue has not been applied. Crops respond readily if soil fertility is kept high. This is a good soil for plants that can tolerate moist conditions. (Capability unit IIw–1.)

Hilly Land, Loamy and Gravelly Sediments

Hilly land, loamy and gravelly sediments (14 to 25 percent) (Ha).—This land type is similar to Rolling land, loamy and gravelly sediments, except that it is shallower and has steeper slopes. Runoff is rapid; internal drainage is medium to rapid. Small areas of Hilly land, loamy sediments have been included with Hilly land, loamy and gravelly sediments.

Use and management.—Practically all of this land type is in cutover hardwood forest. It is best suited to forest. (Capability unit VIe–2.)

Hiwassee Series

The Hiwassee soils in Fairfax County were mapped with the Wickham soils as complexes. A brief description of the Hiwassee soils is given in the description of the complex, Wickham and Hiwassee loams, undulating phases.

Huntington Series

The Huntington series consists of fertile, brown, deep, well-drained soils on the first bottoms along the Potomac River. The soils have developed in alluvium that has washed from uplands underlain principally by limestone. They occur as narrow strips on the highest parts of the bottom lands and are subject to flooding. The Huntington soils are associated with the Lindside soils of the bottoms.

Huntington silt loam (0 to 2 percent) (Hb).—A profile of this soil in a wooded area is described as follows:

0 to 16 inches, very dark grayish-brown to dark-brown, very friable silt loam; moderate, fine and medium, granular structure; numerous wormholes and grass roots.

16 to 50 inches, very dark grayish-brown, heavy silt loam; dark brown when crushed; moderate to strong, fine to medium, subangular blocky structure; grayish cast on cleavage planes of peds; wormholes plentiful.

50 to 60 inches +, very dark grayish-brown, light silty clay loam; dark brown when crushed; friable; moderate, very fine to fine, subangular blocky structure; wormholes fairly plentiful; layer usually mottled with yellowish brown below a depth of 5 or 6 feet.

Range in characteristics.—Some areas of this soil have layers of very fine sandy loam in the subsoil and lighter brown colors throughout the profile. Depth over beds of gravel and sand range from 3 to as much as 10 feet. Some areas have a silty clay loam surface layer and a definite subangular blocky structure. Other areas contain slightly compact, loamy layers at a depth of 20 to 30 inches below the surface. A few areas that resemble the Sequatchie and Elk soils (neither of these was mapped in Fairfax County) have been included with this soil.

Huntington silt loam ranges from medium acid to moderately alkaline in reaction, but in most places it is slightly acid to neutral. It is high in organic matter and in natural fertility. Runoff is slow; internal drainage is medium. The surface layer is rapidly permeable; the subsoil, moderately to rapidly permeable. The water-holding capacity is moderate to high. There are no erosion hazards, but some fine soil material accumulates during floods. The soil is easy to conserve but, because of the hazard of overflow, it has a narrower suitability for crops than some of the better upland soils.

Use and management.—Except for very narrow strips near riverbanks that are in sycamore, willow, and other water-tolerant trees, this soil is used for crops and permanent pasture. Most cultivated areas are used for corn, which is grown year after year with little fertilization. Some corn, however, is grown in a rotation with hay. In a few places, small grains are grown occasionally, but because of moisture and the high fertility of the soil, small grains lodge and produce large quantities of straw, but only small quantities of grain. Mixed hay and forage crops other than alfalfa produce high yields. Yields of corn are fairly high if the soil is not flooded and short-season hybrids are grown. Yields are considerably less in years when the soil is flooded.

The soil is too moist for alfalfa. Mixtures of grasses and other legumes can be grown, but a little lime may be needed in some areas. With little fertilization, the soil is suited to nearly continuous production of corn. Management should include mainly light fertilization and the use of improved methods of tilling and preparing seedbeds and the selection of higher yielding hybrids. Permanent pasture can be maintained in good condition if grazing is regulated, fertilizer is applied in small amounts, and proper mixtures of plants are seeded. (Capability unit IIw–3.)

Iredell Series

The Iredell series consists of moderately deep, moderately well drained to somewhat poorly drained soils that have an extremely plastic claypan. The soils have developed in residuum that weathered from diabase. They are associated with the Mecklenburg, Montalto, and Elbert soils of the Piedmont Lowland, or Triassic area. The Iredell soils are not extensive, and most of the areas were mapped as complexes with the Mecklenburg soils. The Iredell soils resemble the Mecklenburg soils in color; the latter, however, are better drained and do not have a claypan. The Iredell soils resemble the Kelly and the Orange soils in that they have a claypan.

However, the Orange and the Kelly soils have formed in different parent materials and are lighter colored throughout.

Iredell silt loam (2 to 7 percent) (Ia).—A profile of this soil in a cutover pine forest is described as follows:

- 0 to 7 inches, yellowish-brown, very friable, moderately fine to medium, granular silt loam; many tree roots.
- 7 to 11 inches, dark yellowish-brown to yellowish-brown silty clay loam faintly mottled with dark grayish brown and very dark gray; friable, slightly plastic; weak, fine, subangular blocky structure.
- 11 to 26 inches, yellowish-brown to dark-brown clay; extremely plastic and sticky; massive; large tree roots common; black mineral specks and rounded concretions of manganese in the lower part.
- 26 to 29 inches, predominantly dark yellowish-brown clay; extremely plastic and sticky; massive; black specks and concretions common.
- 29 to 32 inches, mottled dark yellowish-brown, olive-brown, white, and black, compact sandy loam diabase soil material.

Range in characteristics.—The surface layer ranges from 5 to 8 inches in thickness; the subsoil above the claypan, from 2 to 7 inches. The claypan is 6 to 28 inches thick; the average thickness is about 18 inches. In most places the depth to hard rock is less than 4 feet. The C horizon is usually fairly thin and in most places is only 2 to 10 inches thick. Included with this soil is a small acreage that is somewhat poorly drained.

Iredell silt loam has a strongly acid to medium acid surface layer and medium alkaline to mildly alkaline claypan and parent material. It is difficult to work. Supplies of organic matter are low, but natural fertility is moderate to high. Runoff is medium to moderately slow; internal drainage is slow to very slow. The water-holding capacity is high. Because it has an extremely plastic claypan, the soil is very slowly permeable to roots, water, and air. Most of the water that collects on the surface runs off or evaporates before it can enter the claypan. This is not an extensive soil, and most of it is near Bull Run.

Use and management.—Most of this soil is forested or is idle. A few areas are cropped or are in permanent pasture. The management this soil needs is similar to that described for the Iredell-Mecklenburg complex. Iredell silt loam is more difficult to work than the Mecklenburg soils and is best suited to permanent pasture and mixed hay, but not to alfalfa. Forests consist mostly of hardwood and cedar trees, which grow slowly on this soil. (Capability unit IVw-1.)

Iredell-Mecklenburg silt loams, eroded undulating phases (2 to 7 percent) (Ib).—This mapping unit consists of such an intricate pattern of Iredell and Mecklenburg silt loams that it was impractical to map them separately. Both components of this complex have formed in residuum that weathered from diabase and syenite. These rocks occur as dikes, sills, and stocks in the Triassic plains. The Iredell and the Mecklenburg soils are associated with the Montalto soils, and with the Elbert soils, which have developed in the residuum from the rocks adjacent to the dikes, sills, and stocks.

Iredell silt loam, eroded undulating phase, is the more extensive but less desirable soil of the complex. It is underlain chiefly by diabase, is moderately well drained, and has a claypan in the subsoil. This component is browner throughout, slightly better drained, and more productive than most of the Iredell soils in Fauquier and Culpeper Counties, Va.

A profile of the Iredell silt loam component in a cultivated area is described as follows:

- 0 to 8 inches, yellowish-brown silt loam; friable; moderate, medium, granular structure.
- 8 to 13 inches, yellowish-brown silty clay loam; slightly plastic; weak, fine, subangular blocky structure; lower 3 inches is heavy, plastic silty clay loam faintly mottled with yellowish red, light brownish gray, and yellowish brown.
- 13 to 24 inches, yellowish-brown to dark-brown clay; extremely plastic; massive; round, black concretions, which show black streaks on cut surfaces.
- 24 to 28 inches, dark yellowish-brown clay; extremely plastic; massive; many, small, black specks and concretions.
- 28 to 34 inches, mottled black, light olive-brown, strong-brown, white, and gray, coarse sandy loam diabase rock material; very friable; in most places the upper 2 inches contain some sticky, plastic clay.

Range in characteristics.—The Iredell component varies chiefly in thickness of the profile layers and in depth to bedrock. The surface layer is 2 to 10 inches thick. In places a few shallow gullies have formed. The upper subsoil ranges from 4 inches to as much as 10 inches in thickness, and immediately above the claypan horizon in most places, it is faintly mottled with brown, yellow, and gray. The claypan is 6 to 28 inches thick, but the average is about 18 inches thick. The depth to hard bedrock is less than 4 feet in most places. The parent-material horizons are fairly thin.

The Mecklenburg component has a subsoil that ranges from strong brown to yellowish red, but it does not have the extremely plastic claypan of the Iredell component. However, in places there are extremely plastic layers 2 to 6 inches thick, and there are some small red and reddish-brown areas that resemble the Montalto soils. It is thought that the rock underlying the Mecklenburg component of this complex is syenite instead of diabase. The depth to bedrock and the thickness of the profile layers are considerably less than in the Iredell component.

A profile of Mecklenburg silt loam, the other component in this complex, follows:

- 0 to 7 inches, brown to dark-brown, friable silt loam; moderate, medium, granular structure.
- 7 to 14 inches, brown, strong-brown, red, and yellowish-red silty clay loam; slightly plastic; moderate, medium, subangular blocky structure; many black mineral specks.
- 14 to 21 inches, brown to yellowish-red clay; sticky and plastic; contains black mineral specks and splotches, which are more numerous as depth increases; primary structure is coarse to very coarse, blocky, or in some places, prismatic; secondary structure is fine, blocky.
- 21 to 31 inches, mottles like those in the parent material; that is, mottles of brownish yellow, dark yellowish brown, black, and white; medium, coarse, syenite rock material of sandy loam texture.

Iredell-Mecklenburg silt loams, eroded undulating phases, are slightly to strongly acid. They have moderate to high water-holding capacities and are moderate to high in natural fertility. Runoff is mostly medium to moderately rapid, but it is slow in the included level to nearly level areas. Internal drainage is medium to very slow and is best in the Mecklenburg soil areas. The erosion hazard is moderate. Permeability of the surface layer is moderate to moderately rapid; that of the subsoil is moderately slow to very slow. For the most part, the soils in this mapping unit are difficult to work but are fairly easy to conserve. They are only moderately

productive of many crops grown in the area.

Use and management.—About 25 percent of this mapping unit is in permanent pasture, 25 percent is cultivated, 15 percent is idle, and 5 percent is in miscellaneous uses; the rest is in cutover forest.

Cropping systems 4 or 5 years in length are in general use. One of the most common consists of corn, a small grain, and mixed hay. In the longer systems, orchardgrass and fescue are sometimes grown for forage and rotation pasture. This mapping unit is only fairly well suited to crops grown in the area because the dominant Iredell soil has a heavy claypan and slow to very slow internal drainage. The mapping unit is better suited to some small grains and grasses than to corn and other row crops.

Alfalfa is not grown successfully. Clover yields fairly well, although good stands are difficult to establish and to maintain in some seasons. Lespedeza yields well. Excellent pastures of bluegrass and whiteclover have been established. On farms where the Mecklenburg component is dominant, the mapping unit is more workable, more row crops are grown, and higher yields are obtained.

This complex of soils is fairly fertile but is generally low in potassium. Because of their heavy texture, the soils require more lime than the more sandy soils. Lime, phosphate, and potash are the main amendments needed to improve fertility. Nitrogen is needed for corn if manure and crop residue are not available. The soils respond fairly well to additions of manure and crop residue, but not so well as the coarser textured, less fertile soils. (Capability unit IVe–3.)

Iredell-Mecklenburg silt loams, eroded rolling phases (7 to 14 percent) (Ic).—This mapping unit differs from the eroded undulating phases of the Iredell-Mecklenburg silt loams mainly in having lost most of the surface soil through erosion. The plow layer now consists mainly of subsoil. A few acres are included that have occasional shallow gullies. Runoff is medium to rapid, and internal drainage is slow to very slow. Workability and conservability are poor to very poor, and the range of suitability is narrow. Under similar management, most crops grown on this mapping unit yield about 10 to 15 percent less than those grown on the eroded undulating phases of Iredell-Mecklenburg silt loams. This mapping unit is used mainly for crops and permanent pasture, and it needs more careful management than the less steep phases of the Iredell-Mecklenburg complexes. (Capability unit IVe–3.)

Iredell-Mecklenburg stony silt loams, eroded undulating phases (2 to 7 percent) (Id).—The components of this mapping unit are similar to Iredell-Mecklenburg silt loams, eroded undulating phases, except that loose stones as large as boulders are on and in the soils. These stones are 10 to 15 percent of the soil volume and make cultivation difficult to unfeasible. In addition, rock outcrops and some wet spots of Elbert soils are present in many areas. Also included are very small acreages having slopes up to 12 percent and other areas in which occasional small gullies have formed.

Use and management.—Most of this mapping unit is used for permanent pasture; in a small acreage about equal parts are idle or in cutover forest.

Pastures consist mainly of bluegrass and whiteclover. The management commonly practiced consists of adding lime and small amounts of phosphatic fertilizer and close grazing. Lime and fertilizer that contain mainly phosphate and potash are needed for the production of good forage. If only grasses are grown, nitrogen probably will be needed. Clipping and regulated grazing are desirable practices in the management of pasture. (Capability unit VIs–1.)

Iredell-Mecklenburg stony silt loams, eroded rolling phases (7 to 14 percent) (Ie).—This mapping unit is more sloping than Iredell-Mecklenburg silt loams, eroded undulating phases, and 10 to 25 percent of the soil volume is made up of stones.

Use and management.—Practically none of this mapping unit is cultivated. Some of the area is idle, but most of it is cutover forest. Stones make cultivation impractical. Pastures can be improved by applying fertilizer and by growing the more desirable varieties of grasses and legumes. (Capability unit VIs–1.)

Kelly Series

The Kelly series consists of light-colored, somewhat poorly drained soils that have a claypan. The soils have developed in mixed residuum from shaly sandstone and diabase. They occur in large areas on gently undulating, low-lying uplands in the Piedmont Lowland (Triassic). They are associated with the Iredell, Brecknock, Catlett, and Elbert soils. They resemble the Iredell soils in having a strongly plastic claypan. They are lighter in color, have thicker horizons over the claypan, and have formed from different rocks than the Iredell soils.

Kelly silt loam, undulating phase (2 to 7 percent) (Ka).—A typical profile of this soil in a cultivated area is described as follows:

- 0 to 8 inches, brownish-yellow, friable silt loam; when dry, pale brown; fine, weak, granular structure.
- 8 to 18 inches, yellowish-brown, friable, light silty clay loam faintly mottled with gray and strong brown; moderate, medium, subangular blocky structure; some small round concretions in lower 2 inches.
- 18 to 32 inches, dark-brown, very plastic clay; strong, coarse, blocky structure to massive.
- 32 to 50 inches, very dark gray, slightly plastic clay loam or heavy silty clay loam mixed with gray, baked, shaly sandstone material.
- 50 inches +, gray, baked, shaly sandstone.

Range in characteristics.—The thickness and sequence of horizons in the lower subsoil vary considerably from place to place. In places strong, platy structure is in the upper B horizon and just above the plastic claypan. In other places weak, thin, platy structure is noticeable in the lower part of the A_2 horizon. Faint mottles of gray are in the upper subsoil and in the layer over the claypan. In most areas the lower part of the claypan and the parent material are distinctly mottled with shades of gray. The depth of soil over hard rock ranges from 26 to 80 inches. Most of the underlying shaly sandstone is baked gray, but in some areas it is red Triassic shaly sandstone that has not been baked. Small areas of Elbert silt loam are included.

Kelly silt loam, undulating phase, is strongly acid to medium acid in the surface soil. The subsoil is mildly alkaline (pH 7.5) to medium acid. Most areas, however,

are between slightly acid and neutral (pH 6.1–7.3) in reaction.

This soil is comparatively low in organic matter and in natural fertility. The subsoil, however, is fairly high in magnesium and calcium. Because of the claypan, the soil is slowly permeable and has a fairly low water-holding and water-absorbing capacity. Water stays in the soil for a long time after wet seasons and makes cultivation difficult. Runoff is medium to slow; internal drainage is slow to very slow. Although the soil retains added plant nutrients well and is fairly easy to conserve, it is not widely suited to, nor highly productive of, many crops. The slow internal drainage limits its value for crops.

Use and management.—Approximately 15 percent of Kelly silt loam, undulating phase, is idle, 25 percent is cropped, 20 percent is in permanent pasture, 30 percent is in forest, and 10 percent is in miscellaneous uses. Management is similar to that used on the associated Brecknock and Iredell soils.

Because of the claypan (or clayey layer) and accompanying slow internal drainage, this soil is best suited to permanent pasture and hay crops other than alfalfa. Ladino clover and fescue are well suited, and in some years orchardgrass, timothy, lespedeza, red clover, and other grasses and legumes can be grown successfully. If management is good, corn and small grains can be grown successfully, but the preparation of seedbeds and cultivation of row crops are difficult. Lime, a complete fertilizer, manure or crop residue, and timely tillage are needed for proper management of this soil. (Capability unit IVw–1.)

Lenoir Series

The Lenoir series consists of somewhat poorly drained, light-colored, heavy-textured soils on level to nearly level parts of the lower Coastal Plain. The soils have formed from weathered marine clay, sand, and silt. They are associated with the Elkton soils. The Lenoir soils resemble the Bertie and the Dragston soils (neither was mapped in Fairfax County), but they have a clay and silty clay subsoil instead of a clay loam and sandy clay loam subsoil.

Lenoir silt loam (0 to 2 percent) (La).—A profile of this soil in a wooded area is described as follows:

0 to 1 inch, light brownish-gray to light olive-brown, friable silt loam; weak, very fine to fine, granular structure; many small tree roots; about 1/3 inch of partly decomposed forest litter consisting of oak leaves and twigs is on the surface of this horizon.

1 to 6 inches, light yellowish-brown, friable silt loam; weak, very fine, granular structure; many roots.

6 to 15 inches, predominantly pale-yellow silty clay loam to silty clay; firm, plastic; many faint mottles of light gray; moderate to strong, medium to coarse, subangular blocky structure.

15 to 40 inches, gray, plastic clay; many coarse mottles of brownish yellow and white; strong, coarse, angular blocky structure; brownish-yellow mottles increase in number in the lower part; material in this layer shrinks noticeably when dry.

40 to 47 inches, mottled light-gray, white, and brownish-yellow, heavy clay loam; firm, slightly plastic; many gray coatings along root channels and on some soil aggregates; few small roots and root channels.

47 to 67 inches, light-gray fine sandy loam mottled with brownish yellow; contains interspersed strata of sandy clay loam soil material; many discontinuous clay skins on faces of peds; few small roots and root channels.

Range in characteristics.—The surface layer in places is a very fine sandy loam, and it ranges from 5 to 12 inches in thickness. The upper subsoil is sandy clay loam and silty clay loam and ranges from a few inches to 12 inches in thickness. The color of the surface layer and subsoil is brighter where the soil joins the Keyport (not mapped in Fairfax County) and the Mattapex soils. The surface layer is grayer where it joins the Elkton and Othello (not mapped in Fairfax County) soils. In these places the lower part of the subsoil is grayer than in other areas and has a more distinct, angular blocky structure. The material under this soil consists of thin strata of sand, silt, and clay rather than sand, which is the underlying material in many counties.

Lenoir silt loam is strongly acid throughout. The water-holding capacity is high, but water enters the soil very slowly because of clay in the subsoil. Workability is poor, conservability is excellent, and productivity is low to very low. Runoff is slow; internal drainage is slow to very slow.

Use and management.—Nearly all of this soil is in cutover forest. Because of its somewhat poor drainage, this soil has a narrow range of suitability. Some drainage is needed for most crops. The soil is best suited to corn, soybeans, permanent pasture, and hay. Fescue, ladino and alsike clovers, timothy, and other plants that can tolerate excess moisture are suitable. Trees also grow well. The somewhat poor drainage and acidity of this soil probably are the major factors limiting yields. The soil is also low in fertility, and a complete fertilizer that contains mainly phosphorus and potassium is needed for cultivated crops and pasture. (Capability unit IIIw–3.)

Lindside Series

The Lindside series consists of young, moderately well drained to somewhat poorly drained soils on the flood plain of the Potomac River. These soils are forming in mixed alluvium that washed mainly from uplands underlain by limestone. They resemble the Chewacla soils that are forming in alluvium that has washed from the Piedmont Upland.

Lindside silt loam (0 to 2 percent) (Lb).—A profile of this soil in a cultivated area is described as follows:

0 to 10 inches, dark-brown, very friable silt loam; moderate, fine, granular structure.

10 to 23 inches, faintly mottled dark grayish-brown and very dark gray, friable to firm silty clay loam; weak, fine, subangular blocky structure that crushes easily to moderate, granular; many black concretions.

23 to 39 inches, mottled pinkish-gray, light-gray, and brown, friable to firm silty clay loam; moderate, medium to coarse, subangular blocky structure; many small pores and mineral concretions; slightly coarser structure in lower part.

39 inches +, mottled gray and brown silty clay loam to silt loam mixed with many fragments of rock; stratified in places; material below depth of 5 to 6 feet is in many places sandy or very gravelly.

Range in characteristics.—The surface layer is silt loam to silty clay loam, 8 to 18 inches thick. In places the

subsoil is clay to silty clay loam, 2 to 6 feet thick. There are a few wet spots, which are shown on the soil map by wet-spot symbols. Lindside silt loam is better drained in areas that grade to the higher lying Huntington soils. A few areas are included that have a coarse-textured surface layer and rather compact layers in the subsoil.

Lindside silt loam is predominantly slightly acid to neutral, fairly high in natural fertility and content of organic matter, and moderate in water-holding capacity. Runoff and internal drainage are slow. The water table is high. The surface layer is moderately rapidly permeable, but the subsoil is moderately to slowly permeable. On the bottom lands where large creeks that flow from the Piedmont Upland join the Potomac River, the Lindside soil contains material from crystalline rocks and is more strongly acid.

Use and management.—Nearly all of Lindside silt loam has been cleared and is used mostly for cultivated crops and pasture. A few acres are idle or in forest. Corn and mixed hay are grown under management similar to that used for Huntington silt loam, but yields are slightly lower. The yields of corn are high in favorable seasons but are generally low in wet seasons.

Because of the good supply of organic matter and high natural fertility, the favorable reaction, the favorable supplies of moisture in dry or moist seasons, and the nearly level gradient, Lindside silt loam is very well suited to corn and hay, but not to alfalfa. The soil is excellent for permanent pasture. However, slow internal drainage, an abruptly changing water table, and flooding may limit the use of this soil for row crops.

Only very small quantities of nitrogenous fertilizer are needed for this soil, compared to the quantities needed for the less fertile soils of the uplands. Phosphate is needed for most crops, and potash may be needed for some crops.

Artificial drainage would not broaden use suitability unless the soil could be protected from flooding. However, it should increase the yields of crops. (Capability unit IIIw–2.)

Lloyd Series

The Lloyd series consists of deep, well-drained, red soils that have formed in material that weathered from mixed basic and acidic rocks. The soils occupy areas transitional between the well drained Glenelg and Elioak soils and the well drained to moderately well drained Orange and Enon soils. The Lloyd soils resemble the Elioak soils but contain more basic rock material, are less acid, and in most places have a redder, finer textured subsoil and a slightly browner surface layer.

Only one soil—Lloyd loam, eroded undulating phase—was mapped in this series in Fairfax County. This soil has a shallower profile, contains more mica, has a more friable subsoil, and does not have so strongly developed genetic horizons as it does in areas outside of Fairfax County that are typical of the Lloyd series.

Lloyd loam, eroded undulating phase (2 to 7 percent) (Lc).—A profile of this soil in an idle field is described as follows:

0 to 8 inches, brown to dark-brown, very friable loam; moderate, fine, granular structure; many grass and weed roots; few quartz pebbles and cobbles strewn over the surface and embedded in the soil; fine shiny flakes of mica noticeable.

8 to 36 inches, red to dark-red, friable to firm silty clay to clay; moderate, fine to medium, subangular blocky structure; few quartz pebbles and a few small grass roots; upper 3 inches slightly lighter in color and of silty clay loam to silty clay texture; numerous fine flakes of mica and some black mineral specks and concretions.

36 to 48 inches, red, weak-red, reddish-yellow, and yellowish-red, friable silty clay loam; weak, fine to medium, subangular blocky structure; multicolored schist and particles of olive, green, and yellow basic rock make up 15 percent of this horizon; few clay skins on peds; many small flakes of mica; few black mineral flakes and concretions.

48 to 54 inches, mottled red, yellowish-red, strong-brown, yellow, brownish-yellow, and black, partially weathered schist and greenstone material; mixed with small amounts of micaceous silt loam material similar in color.

Range in characteristics.—The texture of the surface layer ranges from loam to silt loam in uneroded areas and from silty clay loam to clay loam in the more severely eroded areas. The subsoil is red to dark-red clay to silty clay loam. The subsoil and parent material of the Lloyd soil in this county are fairly high in mica. Where the parent material does not contain much mica, the Lloyd soil is less firm, is not so well developed genetically, and has a sticky subsoil. Included are a few areas that have slopes of 7 to 14 percent and a few areas in which there are shallow gullies.

Lloyd loam, eroded undulating phase, is strongly to medium acid throughout the profile. In addition, it is low to moderate in organic matter and in natural fertility. Runoff and internal drainage are medium. This soil has a high water-holding capacity and is permeable to roots, water, and air. It retains added plant nutrients well, can be used for many crops, and is fairly easily conserved. High productivity is easily maintained.

Use and management.—About half the acreage of Lloyd loam, eroded undulating phase, is in crops; the rest is mostly in cutover forest. A few cleared areas are reverting to pasture.

This soil is well suited to most crops grown in the county. It is especially well suited to corn, alfalfa, and all kinds of hay, but less well suited to some vegetables. Natural fertility is slightly higher than that of some of the associated soils, and slightly less fertilizer is needed for good yields.

The plant-nutrient and water-holding capacities are high. Consequently, leachable plant nutrients are needed less frequently than for the associated soils. The soil reaction is slightly higher than that of the Glenelg soils, and less lime is needed to raise pH to a desirable level. Most crops need lime, phosphate, and potash. Corn and grass need nitrogen. (Capability unit IIe–1.)

Louisburg Series

The Louisburg series consists of light-colored, shallow, coarse-textured soils that have formed in material that weathered from coarse-grained granite gneiss. The Louisburg soils are associated with the Appling, Colfax, and Worsham soils. In some places they border the Glenelg, Fairfax, and Beltsville soils. The Louisburg soils occupy the narrow ridgetops and adjacent smooth and steep slopes in the east-central part of the county. They are coarser textured, lighter colored, and much

less micaceous than the Manor soils. They lack the subsoil development of the Appling soils.

Louisburg coarse sandy loam, rolling phase (7 to 14 percent) (Ld).—A profile of this soil in a cutover wooded area is described as follows:

0 to 4 inches, grayish-brown, very friable coarse sandy loam; in most places small gravel makes up 5 to 10 percent of this horizon; upper inch more grayish than rest; much small quartz gravel.

4 to 9 inches, yellowish-brown, very friable coarse sandy loam; many small pebbles of quartz and a few small flakes of mica.

9 to 18 inches, mixed yellowish-brown, reddish-yellow, yellowish-brown, and yellowish-red, very friable sandy loam and coarse sandy loam soil material; much small quartz gravel and many mica flakes.

18 to 31 inches, highly mixed reddish-yellow, yellowish-red, brownish-yellow, and white, partly disintegrated granite gneiss; many mica flakes.

Range in characteristics.—The texture of the surface layer and subsoil ranges from loam to gritty sandy loam. Along borders between this soil and the Manor soils, which have formed over schistlike parent material, these two soils are intermixed in an intricate pattern. In these areas a definite separation in the mapping units was impossible. Consequently, a small area of the Manor soils has been included in the area mapped as Louisburg coarse sandy loam, rolling phase. In some smooth areas, a reddish-yellow to yellowish-red sandy clay loam subsoil about 2 to 6 inches thick has developed. This layer resembles that in the Appling soils. A small eroded acreage that contains a few shallow and deep gullies has been included.

Louisburg coarse sandy loam, rolling phase, is very strongly acid to strongly acid throughout. It contains a very small amount of organic matter. It is rapidly permeable to roots, water, and air. Runoff is medium to rapid; internal drainage is rapid to very rapid. Fertility and the water-holding capacity are low. The soil leaches rapidly, and added plant nutrients are difficult to conserve. A high level of productivity is hard to maintain.

Use and management.—About one-fifth of this soil is used for pasture and crops; the rest is wooded or idle. Corn, hay, and small grains are the main field crops grown. Shallowness and slope make this phase poorly suited to crops. The best use of this soil is probably for mixed hay and pasture, but not for alfalfa. If management and the level of fertility are good, some vegetables can be grown. (Capability unit IVe–2.)

Louisburg coarse sandy loam, hilly phase (14 to 25 percent) (Le).—This soil differs from Louisburg coarse sandy loam, rolling phase, chiefly in having steeper slopes and a slightly shallower depth to hard rock. In addition, water intake and the water-holding capacity are lower. Runoff and internal drainage are rapid to very rapid. A few areas contain shallow and deep gullies. This soil varies in much the same way as the rolling phase of Louisburg coarse sandy loam.

Use and management.—Nearly all of this hilly phase is in forest. A few areas are idle or in permanent pasture. This soil has a narrow range of suitability for crops and is better suited to forest or permanent pasture. It responds fairly well to management that consists mainly of regulating the grazing, maintaining fertility at high levels, liming, returning manure and plant residue, and conserving water and soil. (Capability unit VIe–2.)

Louisburg coarse sandy loam, steep phase (25 to 45 percent) (Lf).—This soil differs from the rolling phase of Louisburg coarse sandy loam in having steeper slopes and less depth to bedrock. In addition, its intake of water and capacity for holding water are lower, and the erosion hazard is greater. Runoff is rapid to very rapid, and internal drainage is rapid. A few areas contain shallow and deep gullies. The characteristics of this soil vary in much the same way as those of the hilly and rolling phases of Louisburg coarse sandy loam.

Use and management.—Practically all of Louisburg coarse sandy loam, steep phase, is in forest. A few areas are in pasture and some are idle. Because it is steep, shallow, and droughty, this soil is best suited to forest. However, permanent pasture can be grown successfully if intensive management is practiced. Lime and a complete fertilizer are needed for good pasture. Additional organic matter, improvement in water-holding capacity, and the use of conservation practices are needed. If economically feasible, irrigation would help greatly to increase pasture production. (Capability unit VIIe–1.)

Lunt Series

The Lunt series consists of deep, well-drained, brownish soils that have formed in the weathered products of Coastal Plain sand, silt, and clay of fluvial and marine origin. These soils occupy moderately high terraces between the higher lying Beltsville soils and Hilly land, loamy and gravelly sediments, and the lower lying Matapeake, Mattapex, Sassafras, and Woodstown soils. In most places the Lunt soils are along the lower edge of areas of Hilly land, loamy and gravelly sediments.

The Lunt soils resemble the Sassafras soils in color but are less red and slightly browner. The subsoil is noticeably more sticky.

Lunt fine sandy loam, undulating phase (2 to 7 percent) (Lg).—A profile of this soil in an idle field is described as follows:

0 to 9 inches, dark-brown, very friable fine sandy loam; moderate, granular structure.

9 to 12 inches, strong-brown, friable sandy clay loam; sticky, slightly plastic; weak, medium, subangular blocky structure.

12 to 26 inches, strong-brown to brown, friable, heavy clay loam or sandy clay; sticky, plastic; weak, medium to coarse, subangular blocky structure; few black specks of mineral and few small pebbles of quartz.

26 to 33 inches, strong-brown, friable sandy clay loam; sticky, plastic; weak, medium, subangular blocky structure; many specks of black mineral and few small roots.

33 to 45 inches, dominantly strong-brown, friable sandy clay loam faintly mottled with black, yellowish brown and reddish yellow; sticky, slightly plastic; very weak to medium, fine, subangular blocky structure.

45 to 60 inches, mottled strong-brown, dark-brown, reddish-yellow, light olive-brown, light yellowish-brown, and light-gray sandy loam to light sandy clay loam soil material; friable to very friable, slightly sticky; iron concretions, small rounded gravel, and discontinuous material resembling that in an ironpan.

Range in characteristics.—The texture of the surface layer ranges from loam to light sandy loam; that of the subsoil, from light sandy clay loam to heavy clay loam

and clay. The coarser textured areas of Lunt fine sandy loam, undulating phase, usually adjoin the Matapeake, Sassafras, or Woodstown soils. Very small areas that have thin, red and yellowish-red clay subsoil are present in a few places throughout this soil. Some of the finer textured types were included with this soil because of small extent.

Rounded gravel and a few cobbles are on and in the surface layer of this soil in some places. If gravel and cobbles are numerous enough to interfere with cultivation, the areas are shown on the map by a gravel symbol.

Lunt fine sandy loam, undulating phase, is strongly acid throughout. It is naturally low in fertility and organic matter. Internal drainage is medium. Permeability is rapid in the subsoil of the more sandy areas and moderately slow in the subsoil of the small, heavy-textured areas. The water-holding capacity is moderate to high. The hazard of erosion is slight to moderate. This soil responds well to additions of organic matter and to adequate amounts of fertilizer. Conservability of soil and of plant nutrients is good. The soil is easily worked except in areas where the subsoil is exposed. In these areas cultivation is difficult in wet seasons because the soil is sticky.

Use and management.—Most of this soil is idle, in forest, or in homesites. Little of this soil is used for crops. It is well suited to a wide variety of crops and is relatively productive under good management. Lime and a complete fertilizer are needed for good production, and also proper tillage and return of crop residue to the soil. (Capability unit IIe–2.)

Lunt fine sandy loam, eroded rolling phase (7 to 14 percent) (Lh).—This soil differs from Lunt fine sandy loam, undulating phase, chiefly in having steeper slopes, a slightly thinner profile, and a thinner surface layer that contains a little more gravel. Internal drainage is medium. The hazard of erosion is moderate to severe. A few small areas of a finer textured soil have been included.

Use and management.—Nearly all this soil is idle, forested, or used for homesites. Because it is steep or rolling, this soil is not widely suited to crops. Nevertheless, most crops in the region can be grown if intensive management is practiced. Yields of most crops are 10 to 15 percent less than from the undulating phase of Lunt fine sandy loam. In addition, workability and conservation of soil and plant nutrients are more difficult, and more organic matter and slightly more fertilizer are needed to maintain productivity. (Capability unit IIIe–1.)

Lunt fine sandy loam, eroded hilly phase (14 to 25 percent) (Lk).—This soil differs from the undulating and eroded rolling phases of Lunt fine sandy loam, mainly in having steeper slopes, a thinner profile, and slightly more severe erosion. Runoff is medium to rapid, and internal drainage is medium. A few small areas having a heavy, red subsoil and variable texture and consistence have been included. Pebbles are more numerous in this eroded hilly phase than in the undulating and eroded rolling phases of Lunt fine sandy loam.

Use and management.—Nearly all of this soil is in cutover forest. Because of slopes and erosion, this soil is best suited to pasture or forest. Permanent pasture needs lime and moderately large amounts of a complete fertilizer. Most pastures need phosphate and potash, organic matter, and additional moisture. (Capability unit VIe–2.)

Manassas Series

The Manassas series consists of brown to reddish-brown, moderately deep, well drained to moderately well drained soils. These soils have formed in local alluvium and colluvium that washed from the Penn and Bucks soils. The Manassas soils have gentle slopes, and they occupy depressions and the side slopes at the heads of drainageways. They resemble the Meadowville soils in mode of formation but differ from them in having a slightly redder and shallower profile and in having different parent material. The Manassas soils also resemble the Bucks soils of the uplands but have a thicker surface layer and a less well developed subsoil. Only one soil was mapped in this series.

Manassas silt loam (2 to 7 percent) (Ma).—A profile of this soil in a cultivated area is described as follows:

0 to 12 inches, reddish-brown to brown, very friable silt loam; weak, fine, granular structure; many grass roots; layer is 10 to 30 inches thick.

12 to 27 inches, dark reddish-brown, yellowish-brown, and red, heavy silt loam to silty clay loam; friable; weak, medium, subangular blocky structure; a few pieces of red shale; faint mottles of pale brown; layer is 10 to 20 inches thick.

27 to 36 inches, predominantly reddish-brown, friable silt loam faintly mottled with yellowish red and pinkish gray; numerous small pieces of partly decomposed red shale and some quartz gravel; layer is 6 to 14 inches thick.

Range in characteristics.—The depth to fairly hard rock ranges from 3 feet to as much as 7 feet, but in most places is less than 5 feet from the surface. The surface layer is mainly silt loam, although there are areas of loam and fine sandy loam where Manassas silt loam is associated with Penn fine sandy loam and Bucks loam. At the heads of drainageways, the soil is thicker, and the subsoil is not distinct. On the wide, fan-shaped areas and on long slopes, the surface layer is 10 to 18 inches thick and is underlain by either a developed B horizon or by a buried upland soil. In some areas adjacent to Penn shaly silt loam, there are many angular particles of red shale on and in the soil. Small wet spots of Croton soil occur in places and are usually designated on the soil map by wet-spot symbols.

Manassas silt loam is very strongly to strongly acid and is moderate to high in organic matter and natural fertility. It is permeable to roots, water, and air. Runoff is slow to medium; internal drainage is medium. The water-holding capacity is moderate to high. This soil is moist, mainly because of seepage, when the soils on surrounding uplands are dry. It is easy to work, conserve, and manage. It is productive of many crops generally grown in the county.

Use and management.—About 10 percent of this soil is in permanent pasture, 2 percent is idle, and 3 percent is in forest. Most of the rest is in cultivation.

Corn, small grains, and mixed hay are grown in cropping systems 4 to 6 years in length. The yields of corn and hay are relatively high, compared to those obtained from the associated Bucks and Penn soils.

Manassas silt loam has very good tilth and moisture, is high to moderate in fertility, and is one of the most productive soils in the Triassic area. It is especially well suited to corn, sorghum, soybeans, clover, grasses, and mixed hay, but not to alfalfa. The moist condition of the soil causes alfalfa to die out after only several years of good growth. Small grains lodge badly in wet seasons, but yields ordinarily are good.

Manassas silt loam is suited to intensive use. Productivity could be increased by adequate fertilization and by using short cropping systems that include legumes. Lime, phosphate, and potash are needed for most crops. If manure and crop residue are used, only a small amount of potash and little or no nitrogen will be needed in most places to obtain good yields. This soil responds readily to simple management. (Capability unit IIw–1.)

Manor Series

The Manor series consists of shallow, highly micaceous, somewhat excessively drained soils of the upland. The soils have formed from quartz sericite schist. They are on narrow, rolling ridgetops and the steeper ridge slopes. The surface layer is yellowish brown and is directly over micaceous residuum. Some areas of the Manor soils have a very thin, weakly developed subsoil similar to that of the Glenelg soils. The Manor soils are associated with the Glenelg, Elioak, Meadowville, Glenville, and Worsham soils.

Manor silt loam, rolling phase (7 to 14 percent) (Mb).—A profile of this soil in a cultivated area is described as follows:

0 to 6 inches, yellowish-brown, micaceous silt loam; very friable; weak, fine, granular structure; a few small, angular fragments of quartz and of brownish-yellow, black, and olive schist; many grass roots in upper 2 inches.

6 to 19 inches, yellowish-brown, highly micaceous, light loam soil material; loose to very friable; 40 to 70 percent of layer is fragments of schist and quartz; schist particles are soft and highly weathered and, when crushed, are mostly flakes of fine mica.

19 to 42 inches, predominately olive-yellow, black, reddish-yellow, and strong-brown schist material; soft, highly weathered; contains a little light loam soil material and fragments of quartz.

42 to 50 inches, partially decomposed brown, olive, black, yellow, and reddish schist; soft enough to be bored out with an auger or dug with a shovel or pick; depth to hard rock in most places is usually more than 50 feet.

Range in characteristics.—Many places have a thin, weakly developed subsoil similar to that of the Glenelg soils. Small white pebbles of quartz and multicolored particles of schist are on and in the surface layer in many places. The color of the surface layer varies between brownish yellow and dark reddish brown, and it is lighter in wooded areas. In some places the parent material contains yellowish-red and red soil and schist rock, and in others it contains almost white, highly micaceous rock and soil material. A few outcrops of bedrock and loose stone are present on some areas.

Nearly all of Manor silt loam, rolling phase, has been slightly to moderately sheet eroded, and, in places, occasional deep gullies have formed. A few small areas of a shallow, brown and reddish-brown soil (similar to the Catoctin soils in Loudoun County, Va.) are included.

Manor silt loam, rolling phase, is very strongly to strongly acid and fairly low in organic matter and in natural fertility. It is moderately susceptible to erosion. Runoff and internal drainage are medium to rapid. The soil is fairly high in total potassium, but this nutrient element can be used up quickly in continuous cultivation. The soil is not very retentive of plant nutrients; therefore, more frequent applications of fertilizer are needed to maintain a higher level of fertility than for the Glenelg and Elioak soils. Permeability of the surface soil and parent material is rapid. The water-holding capacity is low. Manor silt loam, rolling phase, is moderately difficult to work and conserve and only fairly productive of most crops grown in the county.

Use and management.—About 18 percent of Manor silt loam, rolling phase, has been cleared and is used for crops or pasture. The rest is idle or wooded.

Management practices used on this Manor soil are similar to those used on the associated Glenelg and Elioak soils. Yields of most crops are slightly less.

Because of shallowness, rolling slopes, rapidly permeable substrata, and low water-holding capacity, this soil is only fairly well suited to row crops. Fairly large amounts of organic matter and a complete fertilizer are needed for good production.

The soil is fairly well suited to most hay and pasture plants, but not to alfalfa. Alfalfa can be grown, however, if a high level of fertility is maintained. Unless it is irrigated, alfalfa will not last so long on this soil as on the Glenelg and Elioak soils. Small grains, lespedeza, orchardgrass, fescue, ladino clover, timothy, and red clover are well suited to the soil.

If this soil is used for row crops, high levels of fertility, rotations that include mainly close-growing crops and sod crops, and mechanical means to control runoff and erosion are needed. Irrigation is more urgently needed on this soil than on the Glenelg and Elioak soils, and it might help some farmers to produce larger and more profitable yields. (Capability unit IVe–2.)

Manor silt loam, hilly phase (14 to 25 percent) (Mc).—This soil differs from Manor silt loam, rolling phase, in that it is shallower to bedrock, has steeper slopes and is more susceptible to erosion, and has a slightly lower water-holding capacity. Runoff and internal drainage are rapid. Many areas have lost considerable surface soil, and, in some places, shallow and deep gullies have formed that are similar to those in the rolling phase of Manor silt loam.

Use and management.—About 80 percent of Manor silt loam, hilly phase, is in forest, about 2 percent is in crops, about 3 percent is idle, and about 15 percent is in permanent pasture and miscellaneous uses. The management used on this soil is similar to that used on Glenelg silt loam, eroded hilly phase. This soil has a narrow range of suitability for crops and is best suited to permanent pasture. It responds readily to management that includes regulation of grazing, maintaining fertility at a high level, applying manure and using plant residue, and conserving water and soil. If used for crops, the soil must be protected from runoff and erosion. (Capability unit VIe–2.)

Manor silt loam, eroded hilly phase (14 to 25 percent+) (Md).—This soil is similar to Manor silt loam, hilly phase, in nearly all characteristics, but most of the orig-

inal surface layer and part of the substratum have been lost through erosion. In addition, the soil is more susceptible to further erosion. Runoff is very rapid, and internal drainage is rapid. A few areas contain shallow and deep gullies.

Use and management.—This soil is best suited to forest. Some areas, however, may be used for permanent pasture if management is good. Most pastures are poor. Timbered areas contain mostly scrub pine and slow-growing second-growth hardwoods. Most areas in trees urgently need management. (Capability unit VIe–2.)

Manor silt loam, steep phase (25 percent+) (Me).—This soil differs from Manor silt loam, hilly phase, mainly in having steeper slopes. Runoff is very rapid, and internal drainage is rapid.

This soil is very susceptible to erosion and has a very narrow range of suitability for crops. It is best suited to forest or permanent pasture. Pastures need very intensive management. Forests should be protected from fire and grazing. (Capability unit VIIe–1.)

Marsh

Marsh (Mf).—This is a fresh-water marsh in which the mineral soil is under water most of the time. It consists of a mat of organic matter, a few inches to several feet thick, that contains an abundance of decomposed or partly decomposed fibers and roots. Under this material is mottled gray, strong-brown, and reddish-yellow sandy loam, clay loam, silty clay loam, and loamy sand. In a few places mineral soil is on the surface and the living vegetation is a few trees.

Use and management.—For the most part, Marsh supports a growth of weeds, marsh grasses, sedges, and cattails. At present it has no agricultural value. It is probably best suited to wildlife, mainly ducks and muskrats. (Capability unit VIIw–1.)

Masada Series

The Masada series consists of light-colored, gravelly, well drained to moderately well drained soils on old high stream terraces. The soils have formed in alluvium that washed from soils of the Piedmont Upland, and in material from sandstone, shale, and cherty limestone of the valleys and mountains. The Masada soils overlie the residuum from which the Glenelg and Elioak soils have formed. They are associated with these soils and with the Beltsville soils. The Masada soils resemble the Appling soils of the uplands and the Beltsville soils of the high marine terraces. Only one soil was mapped in the Masada series.

Masada gravelly loam, eroded rolling phase (7 to 14 percent) (Mg).—A profile of this soil in a cultivated field is described as follows:

0 to 8 inches, yellowish-brown to very pale brown, very friable gravelly loam; weak, fine, granular structure; much gravel ½ inch to 2 inches in diameter.

8 to 15 inches, brownish-yellow to yellowish-red, friable fine sandy clay loam to silt loam and silty clay loam; weak, fine, subangular blocky structure; much gravel ½ inch to 2 inches in diameter.

15 to 28 inches, predominantly yellowish-red, mixed with red, strong-brown, yellowish-brown, and yellow sandy clay loam to silty clay loam and clay loam; friable, compact, slightly plastic, and sticky; weak to moderate, medium, subangular blocky structure; few gray and white mottles in lower part; much partly weathered and unweathered gravel throughout; in places the gravel is most plentiful in the lower part.

28 to 36 inches, distinctly mottled red, yellowish-red, strong-brown, yellowish-brown, gray, and white sandy clay loam to silty clay loam; friable, slightly plastic, and sticky; compact in places; very weak, platy to moderate, medium, subangular blocky structure; much subangular and rounded gravel and rock fragments; these are up to 3 inches in diameter and consist of quartz, chert, or sandstone.

36 to 46 inches, distinctly mottled red, yellowish-red, reddish-yellow, yellow, and light olive-brown, light silt loam, loam, silty clay loam, and sandy loam soil material; contains much quartz, cherty sandstone, schist, shale, and some greenstone rock material.

Range in characteristics.—The texture of the surface layer ranges from gravelly loam to silt loam; that of the subsoil, from fine sandy clay loam to silty clay. In places a fragipan has developed and the soil is very similar to the Beltsville soil. In other places the subsoil is red like that in the Bradley and Hiwassee, light surface phases (neither was mapped in Fairfax County). The alluvial or fluvial beds are a few feet to more than 25 feet thick over the underlying old land surfaces of the Glenelg or Elioak soils. The soil mantle and the soil material underlying are thinnest in the more rolling areas near the Glenelg and Elioak soils of the residual upland.

Included with this soil is a small acreage that has slopes of 2 to 7 percent or 14 to 25 percent. Also included are small areas that resemble the Beltsville soils and the light surface phase of the Hiwassee soils (not mapped in Fairfax County).

Masada gravelly loam, eroded rolling phase, is strongly acid, low in natural fertility and organic matter, and moderate to low in water-holding capacity. Runoff is medium to rapid; internal drainage is medium to slow. The surface layer is rapidly to moderately rapidly permeable; the substrata are moderately to moderately slowly permeable. The hazard of erosion is slight to moderate.

This soil responds fairly well to additions of organic matter and fertilizer, but not so well as a nongravelly soil. Because of gravel, workability is poor and productivity for most crops is fairly low.

Use and management.—Most of this soil is about equally divided between permanent pasture and homesites. A small part is used as gravel quarries or is idle. This gravelly soil is probably best suited to permanent pasture, forest, small grain, and hay. Lime, a complete fertilizer, and additional moisture are needed for pasture and crops. (Capability unit IVe–2.)

Matapeake Series

The Matapeake series consists of deep, well-drained, moderately heavy textured soils of the lower Coastal Plain. These soils have formed from a mixture of sand, silt, and clay and are associated with the moderately well drained Mattapex soils. The Matapeake soils are on the highest parts of the lower Coastal Plain. They differ from the Sassafras soils in having a coarser textured profile. They are among the best soils in the county.

Matapeake silt loam, nearly level phase (0 to 2 percent) (Mh).—A profile of this soil in a wooded area is described as follows:

0 to 2 inches, dark-brown to very dark yellowish-brown, friable silt loam; moderate, medium to fine, granular structure; many small roots.
2 to 8 inches, yellowish-brown to dark yellowish-brown, friable silt loam; weak, fine, granular structure; many small roots.
8 to 14 inches, strong-brown, heavy silt loam or silty clay loam; moderate, medium, subangular blocky structure; few roots; few small black mineral specks.
14 to 22 inches, strong-brown to yellowish-red silty clay loam; friable, slightly plastic; weak to moderate, medium, subangular blocky structure; few mineral specks; slightly lighter colored coatings on peds.
22 to 38 inches, dominantly strong-brown very fine sandy clay loam to light clay loam that is faintly splotched in the lower part with yellowish red and pale brown; moderate, medium to coarse, subangular blocky structure; many black mineral films and concretions.
38 to 44 inches, dominantly strong-brown, friable fine sandy clay loam; mottles and streaks of pale brown and light brown; slightly compact; very weak, medium, platy structure that crushes easily to weak, fine, angular blocky.
44 to 52 inches, dominantly strong-brown, slightly compact fine sandy loam; common, medium, distinct mottles of yellowish red, pale brown, and light brown.

Range in characteristics.—The texture of the surface layer is loam to silt loam; that of the subsoil is heavy sandy clay loam, clay loam, and silty clay loam. The substratum below 50 inches is usually fine sandy clay loam, fine sandy loam, clay loam, and loamy sand; in most areas it is heavier than loamy sand or sand.

Small areas of Mattapex silt loam and Sassafras fine sandy loam are included where they are in the transitional area with Matapeake silt loam, nearly level phase. A few pebbles and black concretions of iron are scattered over the surface of this soil in places.

Matapeake silt loam, nearly level phase, is strongly acid throughout its depth. It has a high water-holding capacity, is easy to work and conserve, and under good management produces good yields. The surface layer is rapidly permeable; the subsoil, moderately permeable. The natural fertility is low, but retention of plant nutrients is good.

Use and management.—Most of this soil is in cutover hardwood forest; a very small acreage is in homesites or is idle. This nearly level phase of Matapeake silt loam is highly productive of most all crops grown in the county. Corn, small grains, and hay are slightly better suited to the soil than most vegetable crops. Lime, phosphate, and potash are needed. Nitrogen will be needed for some crops if crop residue and manure are not applied to the soil. Less leaching of plant nutrients is expected in this soil than in the associated Sassafras and Woodstown soils. (Capability unit I-1.)

Matapeake silt loam, undulating phase (2 to 7 percent) (Mk).—This soil is similar to Matapeake silt loam, nearly level phase, except that it has slightly stronger undulating slopes and a thinner profile. In addition, the hazard of erosion is slightly greater, and in a few small areas, 25 percent of the surface layer has been lost through sheet erosion. Runoff and internal drainage are medium.

Use and management.—Nearly all of this soil is in cutover hardwood forest. Because of the slightly steeper slopes, this undulating phase is a little more difficult to conserve than Matapeake silt loam, nearly level phase, and crop yields are slightly less, especially in the dry seasons. In suitability for crops and management needed, this soil is similar to the nearly level phase of Matapeake silt loam. The undulating areas should be cultivated on the contour. (Capability unit IIe-1.)

Mattapex Series

The Mattapex series consists of deep, moderately well drained, medium-textured soils of the lower Coastal Plain. The soils have formed from material similar to that of the Matapeake, Bertie, and Othello soils and are associated with them. (Bertie and Othello soils were not mapped in Fairfax County). Mattapex soils are in slightly lower positions than the Matapeake but are a little higher than the Bertie. The Mattapex soils resemble the Woodstown soils in color, position, and drainage, but the Woodstown soils have a coarser texture throughout the profile.

Mattapex silt loam, nearly level phase (0 to 2 percent) (Mm).—The following is a profile of this soil in a forested area:

0 to 2 inches, grayish-brown, very friable silt loam; fine, granular structure; many small roots; ½ inch of dark grayish-brown, partially decomposed leaf litter on surface.
2 to 8 inches, yellowish-brown to brown, very friable silt loam; fine, granular structure; many small roots; few fine pebbles.
8 to 34 inches, yellowish-brown clay loam or heavy clay loam; faint mottles of strong brown, pale brown, and light gray; slightly plastic, sticky; weak, fine to medium, subangular blocky structure.
34 to 52 inches, dominantly yellowish-brown, slightly plastic sandy clay loam; distinct mottles of light gray and pale yellow; weak to moderate, medium, subangular blocky structure.
52 to 60 inches, dominantly light yellowish-brown, friable, light sandy loam to sandy loam; faint mottles of yellowish brown and light gray; weak, fine, subangular blocky structure.

Range in characteristics.—The texture of the surface layer is silt loam, loam, and very fine sandy loam; that of the subsoil is heavy sandy clay loam, clay loam, heavy clay loam, and silty clay loam. The parent material consists of strata of sand, silt, and clay, mostly sandy loam, clay loam, and silty clay loam with sand in some areas. The color of the subsoil ranges from yellowish brown to olive brown, or to strong brown where this soil joins the Matapeake and Sassafras soils.

Mattapex silt loam, nearly level phase, is very strongly to strongly acid throughout. Runoff is medium to slow; internal drainage is slow. The surface layer is rapidly permeable; the subsoil, moderately slowly to slowly permeable. Supplies of organic matter are low to moderately low. Workability and productivity are good; conservability is very good.

Use and management.—This soil is nearly all in cutover forest. It is widely suited to almost all crops except alfalfa. Crops need a higher level of soil fertility. A complete fertilizer is required, and moderately heavy applications of lime are needed to reduce the soil acidity. Corn, soybeans, and mixed hay are better suited to the soil than small grains and vegetables, although vege-

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tables do well under intensive management. (Capability unit IIw–2.)

Mattapex silt loam, undulating phase (2 to 7 percent) (Mn).—This soil differs from the Mattapex silt loam, nearly level phase, mainly in having slightly steeper slopes and a thinner profile and in being slightly more erosive. Runoff is medium; internal drainage is medium to slow.

Use and management.—Most of this soil is in cutover hardwood forest; a small part is used for homesites and vegetable gardens. Management and use suitability are similar to those of Mattapex silt loam, nearly level phase, except that protection is needed to control runoff, erosion, and the loss of plant nutrients. (Capability unit IIe–3.)

Mayodan Series

The Mayodan series consists of deep, light-colored, moderately well drained soils that have formed from weathered sandstone and shale conglomerate. The soils occur chiefly along the eastern edge of the Piedmont Lowland (Triassic). In Fairfax County they formed in mantle materials that were deposited on the quartz sericite schist material of the Piedmont Upland. For this and other reasons, they are not modal for the Mayodan series. Mayodan soils are associated with the Calverton, Bucks, Penn, and Croton soils and overlie the old land surfaces of the Glenelg and Elioak soils. In this county the Mayodan soils resemble the Fairfax soils in color, depth, texture, and mode of formation; they differ from those soils mainly in parent material.

Mayodan silt loam, undulating phase (2 to 7 percent) (Mo).—A profile of this soil in a cutover wooded area is described as follows:

0 to 7 inches, light yellowish-brown, very friable silt loam; weak, fine to very fine, granular structure; few to many round and subangular pebbles of brownish quartz up to 3 inches in diameter; many shrub and tree roots; upper 1 inch is a dark grayish brown.
7 to 12 inches, yellowish-brown, friable, heavy silt loam; moderate, medium, subangular blocky structure; few roots.
12 to 20 inches, strong-brown silty clay loam; friable, plastic, slightly sticky; moderate, medium, subangular blocky structure; small angular quartz gravel common.
20 to 32 inches, strong-brown, heavy silty clay loam; friable, plastic, sticky; faint mottles of brownish yellow; moderate, fine, subangular blocky structure; particles of reddish shale and sandstone.
32 to 36 inches, strong-brown, yellowish-red, and brownish-yellow, slightly compact, light silty clay loam; weak, fine to medium, subangular blocky structure; in places weak, thin, platy structure; many partially weathered fragments of red, yellow, and brownish sandstone and shale and much round and subangular quartz gravel.
36 to 42 inches, mottled red, brownish-yellow, pink, and reddish-brown, friable sandy clay loam soil material; 50 percent of volume is red and brownish fragments of shaly sandstone; contains pockets and strata of loam, silt loam, silty clay loam, and sandy clay loam similar to materials that have weathered from sandstone conglomerate.
42 inches +, mica schist mixed with material in 36- to 42-inch layer.

Range in characteristics.—The texture of the surface soil is loam, silt loam, very fine sandy loam, and gravelly silt loam; that of the subsoil is sandy clay loam, silty clay loam, clay loam, and clay. Where the mantle materials overlie the older land surface, the depth to gravel (stone line) ranges from 20 to 48 inches in most places. Small areas of Calverton loam that have a distinct fragipan, as well as a small acreage of Mayodan silt loam, rolling phase, have been included with Mayodan silt loam, undulating phase.

Mayodan silt loam, undulating phase, is acid throughout. The surface layer is moderately rapidly permeable, and the subsoil is moderately slowly to slowly permeable. The soil is low in organic matter and natural fertility. Productivity is fair; workability and conservability are good.

Use and management.—Mayodan silt loam, undulating phase, is used principally for forest and pasture. A very small acreage is used for corn and small grains, and a small part is idle. This soil is fairly well suited to most crops except alfalfa. It responds readily to management. Good yields of most crops can be obtained by applying lime, phosphate, and potash. Short cropping systems are suitable. The soil needs large amounts of organic matter, and the use of crop residue to enrich the soil is very important. Mechanical measures other than contour cultivation and sod crops in the rotation are not needed for the control of runoff and erosion. (Capability unit IIe–3.)

Meadowville Series

The Meadowville series consists of deep, brown, well drained to moderately well drained soils in alluvium. These soils are associated with the Glenelg, Elioak, and Manor soils and have formed in colluvium that washed from these soils. The Meadowville soils are in low positions and depressions near the heads of drainageways and at the bases of slopes. Most areas cover 1 to 5 acres. Only one soil was mapped in this series.

Meadowville silt loam (2 to 7 percent) (Mp).—A profile of this soil in a cultivated area is described as follows:

0 to 14 inches, brown, very friable silt loam; strong, medium, granular structure; material in upper 2 inches is darker in color and contains many grass roots.
14 to 28 inches, strong-brown, friable silty clay loam; strong, medium, subangular blocky structure.
28 to 48 inches, reddish-yellow, friable to slightly firm silty clay loam; weak to moderate, medium, subangular blocky structure; few streaks and films of black mineral.
48 to 54 inches, mottled strong-brown, reddish-yellow, and yellowish-red, very friable, heavy silt loam; weak, fine to medium, subangular blocky structure; few black streaks; few small fragments of quartz; coarse material and quartz more plentiful in lower part.

Range in characteristics.—The thickness of the surface layer ranges from 10 to 24 inches. In places near the center of drainageways, the surface layer and subsoil are similar, but in most places the subsoil is distinctly developed and ranges in color from strong brown through yellowish brown to yellowish red. Small wet spots that resemble the Worsham and Glenville soils are included with this soil. These wet spots are shown on the soil map by wet-spot symbols. Very recent deposits of mixed silt, schist, and quartz gravel are common on the surface below areas that have been gullied.

Meadowville silt loam is strongly acid to medium acid and fairly high in organic matter and natural fertility. It is permeable and retentive of moisture and plant nutrients. Surface runoff is medium to slow; internal drainage is medium to rapid. This soil receives some

seepage from surrounding slopes, and it stays moist when surrounding soils are dry. It has a moderately good water-holding capacity and a moderately wide range of suitability for most crops grown in the area. The range of moisture in which the soil can be cultivated is somewhat narrower than for the associated soils, but the soil is easily cultivated and conserved.

Use and management.—Approximately 50 percent of Meadowville silt loam is in crops, 25 percent is in pasture, 5 percent is idle, and 20 percent is forested.

Management practices are similar to those used for the Glenelg soils. However, smaller amounts of fertilizer and manure are used for some crops on this soil.

Meadowville silt loam is excellent for corn, ladino clover, orchardgrass, fescue, red clover, lespedeza, and many vegetables. It is not well suited to alfalfa and many of the small grains. Alfalfa produces well for 1 to 3 years; then it gradually dies out, mainly because of the high moisture content of the soil. Small grains lodge badly in wet seasons, especially if the fertility level is moderate to high. Lime, phosphate, and potash are needed in a balanced fertilizer program. This soil needs less nitrogen and organic matter than the associated upland soils. Some ditching might be needed to drain small wet spots in fields that are to be used for row crops. (Capability unit IIw–1.)

Mecklenburg Series

The soils of the Mecklenburg series in Fairfax County were mapped with the Iredell soils as complexes. A typical profile of Mecklenburg silt loam is given in the description of Iredell-Mecklenburg silt loams, eroded undulating phases.

Mixed Alluvial Land

Mixed alluvial land (0 to 2 percent) (Mr).—This is a land type that consists mainly of recent mixed alluvium that washed from soils of the uplands and lodged on first bottoms along some of the smaller streams. The soils comprising this land type are associated with other soils of the flood plains, with soils of the colluvial lands, and with many soils of the uplands. Most of these associated soils are somewhat poorly to poorly drained, but small areas are well and moderately well drained. Mixed alluvial land is subject to frequent flooding and to additional deposits of fresh sediment.

Many kinds of profiles and soil conditions are in this mapping unit. In places the complex consists of soils that are similar to the Chewacla, Wehadkee, Bowmansville, and Rowland soils. In other places the material is chiefly brown to mottled brown, yellow, and gray, fine-textured sediment, 6 to 4 inches thick, on beds of sand, pebbles, and cobbles. Along the bases of slopes and at the mouths of intermittent drainageways adjacent to the first bottoms, small areas of colluvial material, similar to the material in the Manassas, Croton, Meadowville, and Worsham soils, are included with this land type. All the soils in this land type are not so well developed as similar soils on the larger river and creek bottoms. The layer of sediment in most places is less than 25 inches thick to the underlying sand, pebbles, and cobbles.

Areas of this land type in colluvial positions adjacent to the bottoms are least subject to overflow. In these positions, the surface layer is brownish, yellowish, or grayish, friable or very friable silt loam, gravelly loam, and sandy loam. The subsoil is mottled with yellow, brown, and red, and it is friable to firm and weakly developed. In many places this land type contains pebbles and cobbles. Small areas near creek banks consist mainly of coarse sand, gravel, and cobbles.

This land type is mainly medium to very strongly acid. Natural fertility and the supply of organic matter range from high to low. The browner, deeper, better drained areas are highest in organic matter and plant nutrients; the shallow, light-colored, gravelly areas are lowest. The water-holding capacity is high to low; permeability is moderate to very rapid in most places.

Use and management.—Nearly all of this land type has been cleared and used for crops. Now about 83 percent is in forest, 10 percent is in pasture, 5 percent is idle, and 2 percent is cultivated.

Forests are mostly sycamore, birch, black willow, swamp white oak, white oak, and other water-tolerant trees and shrubs. Crops are mainly garden vegetables and hay and a little corn. Pastures consist mainly of bluegrass, whiteclover, rushes, stickweed, sedge nutgrass, and other less desirable grasses and weeds. Few pastures have been limed, fertilized, or otherwise properly managed.

Because of poor natural drainage, flooding, and consequent poor workability, this land type is better suited to pasture or forest than to cultivated crops. A few higher lying spots in the better drained areas, however, can be used for hay, vegetables, and other row crops.

Practices that are necessary to improve pastures consist of applying fairly liberal quantities of fertilizer and lime, grazing forage fairly closely, and clipping the undesirable herbage. Ditching or bedding is needed on some areas before good pasture can be established and maintained. Phosphorus is perhaps the most needed plant nutrient. (Capability unit Vw–1.)

Montalto Series

The Montalto series consists of well-drained, brown soils that have a thin, friable, red subsoil. The soils are on moderately high, narrow, upland ridgetops and side slopes in the Piedmont Lowland (Triassic). They have formed from the weathered products of medium-grained syenite or syenitic diabaselike rock materials. For the most part, the Montalto soils are associated with the Iredell-Mecklenburg complex and with Elbert soils and occupy the highest elevations among them.

Montalto silt loam, eroded rolling phase (7 to 14 percent) (Ms).—A profile of this soil in a cultivated area is described as follows:

0 to 7 inches, reddish-brown to brown, very friable silt loam; moderate, medium, granular structure; few small basic pebbles.

7 to 14 inches, dark-red to red, friable silt loam; very weak, fine to medium, subangular structure crushes easily to coarse, granular; small black concretions and small speckled syenite pebbles.

14 to 26 inches, red, friable, slightly sticky, light silty clay loam; very weak, fine, subangular blocky structure that crushes easily; many small fragments of syenitic diabase,

black concretions, and small flakes of mica; fragments more numerous in lower 3 inches.

26 inches +, red, yellow, yellowish-brown, and black, very friable coarse sandy clay loam soil material; mottles like those in parent material; many pieces of hard basic rock; horizon usually thin over hard bedrock.

Range in characteristics.—The thickness of the surface layer ranges from 2 to 8 inches; that of the subsoil, from a few inches to as much as 40 inches. In most places, however, the subsoil is less than 18 inches thick. The texture of the subsoil is mostly silty clay loam, but it is plastic clay in a few places. Included with this soil is a small acreage of Ruxton silt loam and Ruxton stony silt loam (neither one mapped in Fairfax County), and a few outcroppings of loose, angular cobbles. Also included are a few areas of stony land that are shown on the soil map by stone symbols.

This Montalto silt loam, eroded rolling phase, is medium acid in most places but ranges from strongly acid through medium acid. It is moderately susceptible to erosion. Natural fertility and the supply of organic matter are medium. The permeability of the surface layer is rapid; that of the subsoil is moderate. The water-holding capacity is moderate. The soil is easy to conserve and work and very productive. Runoff and internal drainage are medium to rapid.

Use and management.—Most of Montalto silt loam, eroded rolling phase, has been cleared and is cultivated. Of the rest, about 10 percent is idle, 20 percent is pastured, and 15 percent is forested.

Cropping systems 3 to 6 years in length are in general use. One of the most common consists of corn, a small grain, and hay. Alfalfa, lespedeza, red and ladino clovers, orchardgrass, or mixtures of these are suitable for hay. Most crops are limed and fertilized, and the yields are fairly high. Because of smooth slopes, good workability, medium fertility, and moderate water-holding capacity, this soil is well suited to many crops commonly grown in the county, including many vegetables.

This soil is low in total potassium. Lime, phosphate, and potash are needed in a well-balanced fertility program. Some nitrogen will be needed for corn and grasses if manure is not used and legumes are not grown in the cropping system. Simple management practices to control runoff and erosion are needed. (Capability unit IIIe–1.)

Orange Series

The Orange series consists of moderately deep, light-colored, moderately well drained soils that have formed in material that weathered from greenstone, serpentine, hornblende, and associated rocks. These soils have a thin to moderately thick, extremely plastic claypan in the lower subsoil. This layer resembles that in the Iredell and the Kelly soils. The Orange soils have a thicker, lighter colored surface layer and upper subsoil than those in the Iredell soils. The Orange soils are associated with the well-drained Lloyd, Enon, and Bremo soils and with the poorly drained Elbert soils. In some places they border the Glenelg and the Elioak soils; in other places they border the Penn, Calverton, and Kelly soils.

Orange silt loam, undulating phase (2 to 7 percent) (Oa).—A profile of this soil in a wooded area is described as follows:

¼ inch to 0, very dark grayish-brown and light-brown forest duff.

0 to ½ inch, grayish-brown, very friable silt loam; weak, very fine, granular structure; many roots.

½ inch to 9 inches, light yellowish-brown, very friable silt loam; weak, very fine, granular structure.

9 to 15 inches, light yellowish-brown to light olive-brown, friable silty clay loam; weak, medium, subangular blocky structure; small concretions in the lower part.

15 to 23 inches, predominantly yellowish-brown, heavy silty clay loam to light silty clay mottled with strong brown and light gray; friable, plastic; strong to moderate, fine to medium, subangular blocky structure; many small black rounded concretions; gray mottles most prevalent in the lower 3 inches and just above the claypan; abrupt boundary.

23 to 41 inches, yellowish-brown clay with a few mottles of light brownish gray, pale olive, and strong brown; extremely plastic, very hard; massive.

41 to 42 inches, black, white, green, and gray, weathered sandy loam soil material; in places this material is a sandy clay loam; intermingled with fairly fresh hornblende or greenstone rock materials.

Range in characteristics.—The upper subsoil over the claypan is 15 to 28 inches thick, but the normal thickness is about 18 inches. The claypan ranges from 4 to 18 inches in thickness but is generally about 12 inches thick. Bedrock is 2 to 4 feet from the surface in most places. A few rock outcrops, loose angular cobbles, and small concretionary gravel and stones and a few wet spots are characteristic throughout the area of this soil. Layers that contain large numbers of iron and manganese concretions are fairly common in some areas. Small areas of Bremo silt loam that do not have a plastic clay subsoil were included in mapping this soil.

Orange silt loam is medium to strongly acid and relatively low in natural fertility. It is low in organic matter and moderately high in water-holding capacity. The surface soil is moderately rapidly permeable, and the subsoil is very slowly permeable. Runoff is medium to slow, and internal drainage is slow to very slow. The soil is fairly difficult to work because of heavy clay in the subsoil. It can be cultivated in a narrow range of moisture conditions. The hazard of erosion is low to moderate.

Use and management.—Most of this soil is in cutover forest. A small part is used for permanent pasture, crops, and homesites. Because of the heavy, plastic clay subsoil and slow internal drainage, this soil is best suited to permanent pasture or mixed hay. It is poor for homesites, septic-tank drainage fields, and roadbeds. The soil is limited in fertility, and a complete fertilizer, especially one containing potash and phosphate, is needed for most crops. Lime is needed in most areas. Manure and other forms of organic matter are needed for good production. (Capability unit IVe–3.)

Penn Series

The Penn series consists of shallow, somewhat excessively drained soils that have developed from fine- to coarse-grained, pinkish-red arkosic sandstone of the Piedmont Lowland (Triassic) and shale. The Penn soils are associated with the Bucks, Readington, Calver-

ton, and Croton soils. The loam and fine sandy loam types of the Penn soils are less red, especially in the surface layer, than the silt loam types.

Penn loam, eroded undulating phase (2 to 7 percent) (Pd).—A profile of this soil in a cultivated area is described as follows:

0 to 7 inches, yellowish-brown, pale-brown, reddish-brown, and grayish-brown, very friable loam to fine sandy loam; weak, fine, granular structure.

7 to 14 inches, yellowish-brown, brownish-yellow, reddish-brown, and red, friable loam to silt loam soil material; layer contains many fragments of sandstone having colors similar to those of the soil material.

14 to 19 inches, 70 to 90 percent of the soil volume is pinkish-red, red, reddish-brown, pale-brown, weak-red, and white fragments of sandstone, which are mixed with loam, fine sandy loam, and sandy loam soil material.

Range in characteristics.—This soil includes a small area that has a few deep gullies and other areas that have a sandy loam surface layer. Many places have a thin silt loam, loam, and fine sandy clay loam subsoil. The thickness of soil to bedrock ranges from 10 to 25 inches, but in most places, it is less than 18 inches. A few river cobbles up to 6 inches in diameter are present where this soil occurs near stream terraces. These areas are shown on the detailed soil map by symbols. In many places, the parent material is fairly uniformly sandstone, but in transitional areas adjacent to the silt loam types, the parent material consists of parallel strata of coarse-grained sandstone, fine-grained sandstone, and shale or shaly sandstone. In these areas, the surface layer ranges from coarse sandy loam to silt loam, but is mostly loam. In some other places, angular cobbles and gravel are in the soil. Most of these areas are underlain by sandstone conglomerate.

Penn loam, eroded undulating phase, is extremely acid to very strongly acid. The surface layer and subsoil are rapidly permeable. Runoff is medium, and internal drainage is rapid to moderately rapid. The water-holding capacity is low to very low. Natural fertility is low. Workability is good, and it is somewhat better than in the silt loam and shaly silt loam types of the Penn soils. The erosion hazard is moderate to severe; more gullies have formed in this soil than in Penn silt loam, eroded undulating phase.

Use and management.—Most of this soil is in cultivation or in permanent pasture. The remainder is about 15 percent cutover forest and 8 percent idle and in miscellaneous uses.

This soil is managed about like Penn silt loam, eroded undulating phase, but is coarser textured and more susceptible to erosion and leaching. It also requires less lime, slightly heavier applications of a complete fertilizer, and more careful methods of erosion control than the Penn silt loams. It is better suited to vegetables, but its range of suitability is similar to that of the Penn silt loams. (Capability unit IIIe–2.)

Penn loam, eroded rolling phase (7 to 14 percent) (Pe).—This is a shallow soil on the side slopes of smooth upland ridges. It generally is adjacent to Penn loam, eroded undulating phase, and differs from it in slope and in having a slightly shallower profile. Runoff and internal drainage are moderately rapid to rapid. The erosion hazard is moderately high to high. A small acreage that has occasional deep gullies is included, and also areas that have a sandy loam texture.

Use and management.—Nearly all of this soil has been cleared and is cultivated. At present most areas are in permanent pasture or are idle. A few areas have reverted to trees, and some are still used for crops.

Mainly because of shallowness, rolling slopes, and the high susceptibility to erosion, Penn loam, eroded rolling phase, is best suited to pasture. Lime, a complete fertilizer, and careful grazing are needed to maintain good pastures. The soil responds well to additions of manure and other organic matter. (Capability unit IVe–2.)

Penn loam, eroded hilly phase (14 to 25 percent) (Pf).—This soil is shallow, and it occupies very strongly sloping hillsides near streams. It occurs in the more deeply dissected parts of the Piedmont Lowland. Other than in shallowness and steeper slopes, it is like the eroded rolling phase of Penn loam. Runoff is rapid to very rapid, and internal drainage is rapid. A small acreage that has occasional deep gullies is included, and also areas that have a sandy loam texture.

Use and management.—Most of this eroded hilly phase of Penn loam is forested and pastured; a few areas are idle or in crops.

Because it is steep, shallow, and erosive, Penn loam, eroded hilly phase, is better suited to pasture or forest than to crops. Intensive management, similar to that described for the eroded rolling phase of Penn loam, is needed for pastures. (Capability unit VIe–2.)

Penn fine sandy loam, eroded undulating phase (2 to 7 percent) (Pa).—This soil is similar to Penn loam, eroded undulating phase, but has a coarser texture and a slightly lighter color throughout the profile. Runoff is medium; internal drainage is very rapid. The erosion hazard is moderate.

Use and management.—Most of this soil has been cleared and is used for crops. At present about half the acreage is either pastured or forested. Mainly because of its coarser texture, this soil is less productive, more droughty, and lower in natural fertility than the eroded Penn silt loams and eroded Penn loams. Ample moisture, a complete fertilizer, lime, and organic matter are needed to make this soil highly productive. (Capability unit IIIe–2.)

Penn fine sandy loam, eroded rolling phase (7 to 14 percent) (Pb).—This is a shallow, excessively drained soil that formed in material weathered from Triassic sandstone. It differs from Penn fine sandy loam, eroded undulating phase, mainly in having steeper slopes and a thinner profile. Runoff and the hazard of erosion are greater than for the eroded undulating phase.

Use and management.—Most of this soil has been cleared and is used for permanent pasture and crops. It is better suited to pasture or forest than to crops. However, if management is good, it can be used for small grains and hay. For high yields, this soil should be brought to a fertility level as high as that of the eroded undulating phase of Penn fine sandy loam. (Capability unit IVe–2.)

Penn fine sandy loam, eroded hilly phase (14 to 25 percent) (Pc).—This soil differs from Penn loam, eroded undulating phase, in texture of the surface layer and in having a somewhat coarser textured subsoil. In addi-

tion, the surface layer is a little thinner and the depth to bedrock is less. There are few gullies.

Use and management.—Little of this soil is cultivated; most of it is forested or pastured. Steep slopes and shallowness to bedrock make this soil unsuitable for cultivation. Careful management and a good cover of living vegetation are needed to protect the soil when it is used for pasture. (Capability unit VIe–2.)

Penn silt loam, eroded undulating phase (2 to 7 percent) (Pm).—This soil is red, shallow, and somewhat excessively drained to well drained. It has developed from shale and sandstone of the Piedmont Lowland (Triassic). It occupies low, smooth uplands and narrow ridges. Internal drainage is medium to somewhat rapid. This soil is associated with the other Penn soils and with the Bucks, Readington, Calverton, and Croton soils. It differs from the Catlett soil mainly in its darker red color.

The following profile of Penn silt loam, eroded undulating phase, is in a cultivated area:

0 to 7 inches, reddish-brown to dark reddish-brown, very friable silt loam; weak, fine, granular structure; few small fragments of shaly sandstone.

7 to 18 inches, red to dark-red, friable silt loam soil material; 40 to 60 percent of layer is blocky, slightly weathered fragments of shaly sandstone.

18 inches +, red, fairly hard, shaly sandstone.

Range in characteristics.—In cultivated areas the surface layer ranges from yellowish brown to yellowish red in color and from 4 to 8 inches in thickness. In places small areas of the Penn loams and Penn shaly silt loams are present. Some loose stone, shale, gravel, and outcrops of bedrock occur locally. The depth of soil over fairly hard bedrock material ranges from 8 to 25 inches. The deeper soil areas occur where the underlying rock is mudstone; the shallower areas, where not eroded, occur over the harder, more resistant shale and sandstone. In many places, small areas of soils that have a weakly developed, thin B horizon similar to that in Bucks soils are mapped with Penn silt loam, eroded undulating phase.

Penn silt loam, eroded undulating phase, is very strongly acid and low in natural fertility. The supply of organic matter is low. Nevertheless, the soil retains added plant nutrients fairly well, and it is easy to work and conserve under intensive cultivation. It is moderately rapidly permeable. Because it is shallow to bedrock, the soil has a low water-holding capacity and is droughty.

Use and management.—Most of Penn silt loam, eroded undulating phase, has been cleared and is used for crops and pasture. Of the rest, about 4 percent is idle and 10 percent is in cutover forest.

Cropping systems 3 to 5 years in length are in general use. One of the most common systems consists of corn, a small grain, and hay. Alfalfa is grown in the system on a few farms, but stands do not last long on this soil, and yields are comparatively low. The best yields of all crops are obtained on dairy farms where plenty of manure is available.

Penn silt loam, eroded undulating phase, has a wide range of suitability. It is suited best to small grains and to hay crops, among which are red clover, timothy, lespedeza, orchardgrass, and fescue. Corn, ladino clover, and many row crops produce well if plenty of manure or crop residue is available and high levels of fertility are maintained. Since alfalfa is not too well adapted, it should be used in mixtures with other forage crops.

Lime in fairly large amounts and a complete fertilizer are needed in a well-balanced fertility program. In most seasons the lack of moisture limits the yields of crops. Deep plowing and addition of manure and crop residue are extremely important on this shallow soil. Irrigation may be feasible in places, and it will greatly help to increase yields of most crops. (Capability unit IIIe–2.)

Penn silt loam, eroded rolling phase (7 to 14 percent) (Pn).—This soil is very similar to Penn silt loam, eroded undulating phase, except that it has stronger slopes, is usually slightly shallower to bedrock, and is slightly more eroded. Runoff is medium to rapid, and internal drainage is moderately slow. The water-holding capacity is less than that of Penn silt loam, eroded undulating phase. A few shallow gullies and occasional deep gullies have formed. The texture and the content of stones and pebbles vary as much in this soil as they do in the eroded undulating phase of Penn silt loam.

Use and management.—A large part of Penn silt loam, eroded rolling phase, is used for permanent pasture. About 15 percent is cultivated, 8 percent is idle, and 12 percent is forested.

The management practices needed for this soil are similar to those needed for the eroded undulating phase of Penn silt loam. However, contour cultivation, the use of longer cropping systems that include more sod-forming crops, and probably stripcropping are needed in places, particularly if row crops are grown.

Penn silt loam, eroded rolling phase, has a narrower range of suitability than the eroded undulating phase and is best suited to permanent pasture. Small grains and hay other than alfalfa can be grown in some areas if management is good. Under similar management, yields of most crops from this soil are less than those obtained from the eroded undulating phase. Lime and a complete fertilizer, or manure and a fertilizer that contains mainly phosphate and potash, are needed to maintain fertility at a high level for permanent pasture or crops. (Capability unit IVe–2.)

Penn silt loam, eroded hilly phase (14 to 25 percent) (Po).—This soil is very similar in most characteristics to Penn silt loam, eroded rolling phase, except that it has steeper slopes. Runoff is rapid to very rapid, and internal drainage is moderately rapid.

Use and management.—Penn silt loam, eroded hilly phase, has a narrow range of suitability because of slope and shallowness. Therefore, most of it is in forest and permanent pasture.

Mainly because the soil is shallow and droughty, most trees grow very slowly. Virginia pine and cedar grow most rapidly in cutover areas. Pastures produce fairly well if intensively managed. Proper management consists of seeding to establish good stands, the use of a complete fertilizer, manure, and lime, and the regulation of grazing. Irrigation should increase pasture yields, and it may be profitable in some areas. (Capability unit VIe–2.)

Penn shaly silt loam, eroded rolling phase (7 to 14 percent) (Pg).—This soil is red, shaly, and very shallow. It has developed from partly weathered red shale of the Triassic area. It is closely associated with the Bucks and with the other phases of Penn soils, but it is inextensive and occurs in small, widely scattered areas. Runoff is medium to moderately rapid; internal drainage is rapid. The soil is shallow in some areas because of erosion. It is shallow in other places because of slowly weathering shaly material.

A profile of Penn shaly silt loam, eroded rolling phase, in a cultivated area is described as follows:

0 to 5 inches, reddish-brown, friable shaly silt loam; 25 to 50 percent of volume is reddish-brown, partly weathered, small, angular fragments of shale.
5 to 10 inches, reddish-brown and light reddish-brown, partly weathered, small, angular, fragments of shale mixed with a small amount of reddish silt loam soil material; between the shale in places are small pockets of reddish silty clay loam soil material.

Range in characteristics.—The soil over hard rock is 5 inches to 15 inches thick; over soft siltstone it is 20 inches or more thick. The parent material is mostly shale, but it contains shaly sandstone, mudstone, and siltstone.

This soil is very strongly to strongly acid and low in natural fertility. Supplies of organic matter are low. The soil is rapidly permeable and low in water-holding capacity.

Use and management.—Nearly all of this soil has been cleared and is now cropped, pastured, or idle.

Crops and management are similar to those for Penn silt loam, eroded undulating phase. However, because of steeper slopes and shallow, droughty condition, Penn shaly silt loam, eroded rolling phase, is not so well suited to crops and is much less productive. Larger amounts of moisture and organic matter and more intensive use of the practices suggested for the eroded undulating phases of the Penn soils are needed for high yields of crops. (Capability unit IVe–2.)

Penn shaly silt loam, eroded hilly phase (14 to 25 percent) (Ph).—This soil is red, shallow, and excessively drained. It is associated with the other phases of the Penn soils, and for the most part, it occupies deeply dissected areas adjacent to streams. Except for hilly relief and a slightly shallower profile, it is like the eroded rolling phase of Penn shaly silt loam. Runoff is rapid to very rapid; internal drainage is rapid. A few areas of Penn silt loam, eroded hilly phase, are included.

Use and management.—Most of Penn shaly silt loam, eroded hilly phase, is in forest, a use to which it is best suited. Trees grow slowly. The present forests consist of Virginia pine, white, red, scarlet, and black oaks, hickory, redcedar, and dogwood. (Capability unit VIe–2.)

Penn shaly silt loam, eroded steep phase (25 percent+) (Pk).—This soil is on steep slopes along large streams. It is more severely eroded than the eroded hilly and eroded rolling phases of Penn shaly silt loam. Most areas have lost practically all the surface soil through erosion. There are a few outcroppings of rock. Included with this soil are areas having a loam texture and those having deep gullies. Most of the acreage is in forest, a use to which this soil is best suited. (Capability unit VIIe–1.)

Raritan Series

The Raritan series consists of deep to moderately deep, somewhat poorly drained soils that occupy low terraces in the Piedmont Lowland (Triassic). Most areas are along Bull Run. A few areas are in depressions on the higher terraces occupied by Birdsboro soils. For the most part, the Raritan soils are subject to flooding only when the water stage is extremely high. They have developed from sand, silt, and clay that washed from soils that are underlain mainly by Triassic sandstone and shale and to some extent by diabase. The Raritan soils are associated with the Birdsboro soils of the stream terraces and with the Rowland and Bowmansville soils of the bottom lands. The Raritan soils resemble the Calverton soils in drainage and color. Only one soil was mapped in this series.

Raritan silt loam (2 to 7 percent) (Ra).—A profile of this soil in a pasture is described as follows:

0 to 8 inches, dark-brown to dark grayish-brown, very friable silt loam; weak, very fine, granular structure.
8 to 11 inches, predominantly yellowish-brown, slightly firm, light silty clay loam mottled with pale brown and dark grayish brown; moderate to strong, medium, angular blocky structure.
11 to 18 inches, mottled dark yellowish-brown, very pale brown, brown, and light brownish-gray silty clay loam; strong, medium, subangular blocky structure.
18 to 24 inches, mottled strong-brown, dark reddish-gray, light-gray, and reddish-brown, heavy silty clay loam; moderate, medium, subangular blocky structure; mottles are large, prominent, and many.
24 to 42 inches, dusky-red, mottled with strong-brown, silty clay loam or light silty clay; moderate, medium, angular blocky structure; few small round pebbles of quartz and pieces of red shale and sandstone in lower part.

Range in characteristics.—The texture of the surface layer is mostly silt loam, but the range is from loam to light silty clay loam. That of the subsoil ranges from silty clay loam to plastic clay. Where this soil joins the Calverton soils, it has a distinct fragipan horizon and more yellowish colors in the upper subsoil. In other places the surface layer is recently deposited reddish-brown silt loam, about 6 to 8 inches thick, that has washed from surrounding soils. Small wet spots where the soil is mottled with gray to the surface are included.

Raritan silt loam is extremely acid to strongly acid, has a moderately high to high water-holding capacity, and is low to moderate in natural fertility and in supply of organic matter. The surface soil is moderately rapidly permeable, and the subsoil is moderately to slowly permeable. Runoff is medium to slow; internal drainage is slow to very slow. Because of the silt loam surface layer and very strongly acid conditions, larger amounts of lime are needed to raise the pH to a given level than in the lighter textured, less acid soils. Raritan silt loam is easy to conserve but difficult to till. It is not so suitable for crops as the well to moderately well drained Birdsboro soils.

Use and management.—Most of this soil is pastured and cultivated. About 10 percent is idle and 2 percent is forested.

Because of unfavorable internal drainage, fertility, and tillage conditions, this soil is best suited to permanent pasture. It can be used for corn, sorghum, soybeans, red and ladino clovers, lespedeza, fescue, orchardgrass, timothy, and redtop. Best suited to this soil are crops that can be planted late in the season—sorghum, short-season varieties of corn, soybeans, ladino clover, fescue, and water-tolerant crops. Alfalfa is not suited, and the yields of small grains are poor, especially in wet seasons.

Ditch drainage may be needed in some places where row crops are to be grown. Lime, a complete fertilizer, manure, and crop residue are needed to keep the soil highly productive. Lime, phosphate, and potash are mostly needed where manure and crop residue are available. These amendments are also the main plant nutrients needed for bluegrass and whiteclover. Nitrogen is needed mainly for corn and grass. (Capability unit IIIw-1.)

Readington Series

The Readington series consists of shallow to moderately shallow, well drained to moderately well drained soils of the Piedmont Lowland (Triassic). The soils have developed in the residuum from almost horizontally bedded, shaly sandstone. They are associated with the Penn, Bucks, Calverton, and Manassas soils. In drainage, color, depth, relief, and other characteristics, the Readington soils are between the Penn and the Calverton soils. They are thicker and better developed than the Penn soils. They are shallower and less well developed than the Calverton soils. Most slope gradients are about 3 percent.

Readington silt loam, undulating phase (2 to 7 percent) (Rb).—A profile of this soil in a cultivated area is described as follows:

0 to 7 inches, yellowish-brown, strong-brown, and reddish-brown, friable silt loam; upper 3 inches are darker; moderate, fine to medium, granular structure; a few red and weak-red fragments of shaly material.

7 to 17 inches, yellowish-red, friable silty clay loam; weak, fine to medium, subangular blocky structure; a few, small, red and weak-red fragments of shaly sandstone.

17 to 21 inches, predominantly dark-red and red, firm silty clay loam soil material mottled with light brown, strong brown, and pinkish gray; weak, fine to medium, subangular blocky structure; small red and weak-red particles of shaly sandstone are plentiful and make red streaks on cut surfaces.

21 inches +, weak-red, red, and pinkish-red, hard shale and particles of shaly sandstone; in most places hard bedrock is mixed with a small amount of reddish silt loam soil material, which is generally a few inches thick over hard, red, shaly sandstone.

Range in characteristics.—Readington silt loam, undulating phase, ranges in thickness from 14 to 30 inches over hard bedrock; in most places it is about 19 inches thick. Small areas of Calverton silt loam and Penn silt loam, too small to map separately, have been included with this soil. Some areas that resemble the Bucks soils, but that have a lighter color and slower internal drainage throughout, are also included. In addition, a few areas in depressions, near the heads of drainageways, that have thicker and browner surface layers similar to those in the Manassas soils are included.

Readington silt loam, undulating phase, is mostly very strongly acid, but it ranges from extremely acid to strongly acid. Natural fertility and the supply of organic matter are low. The surface layer is moderately rapidly permeable, and the subsoil is moderately slowly permeable. The water-holding capacity is moderately low. Runoff and internal drainage are medium to slow. This soil is fairly easy to work, easy to conserve, and, under intensive management, moderately productive.

Use and management.—About 60 percent of Readington silt loam, undulating phase, is cultivated, 25 percent is in permanent pasture, 10 percent is idle and brushy, and 5 percent is forested. Management practices are similar to those used on the associated Penn and Bucks soils, except that little alfalfa is grown. Yields of most crops are similar to those on the Penn soils, except that in dry seasons they are slightly higher on this soil.

Because of strong acidity and low natural fertility, Readington silt loam, undulating phase, needs lime and a complete fertilizer for most crops grown in a system. Because of shallowness, moderately low water-holding capacity, and low supply of organic matter, the soil needs manure and crop residue. It responds well to them.

This soil is suited to corn and sorghum and to mixed hay consisting of red clover, timothy, fescue, ladino clover, and lespedeza. Yields of corn and sorghum are not so good as on the deeper Bucks and Manassas soils. Wheat and other small grains produce well in drier seasons or normal seasons, but yields are low in wet seasons, mainly because of the moderately slow internal drainage and slower runoff. Heaving of small grains, alfalfa, and orchardgrass is severe on this soil in some seasons. (Capability unit IIIw-1.)

Rocky Land

Rocky land, rolling basic rock phase (2 to 14 percent) (Rc).—This land type consists of areas of Montalto, Iredell, Mecklenburg, Orange, and Bremo soils that contain numerous outcrops of basic rock and loose stones. Outcrops and large stones occupy from 15 to 40 percent of the surface and make cultivation impractical. This land type has more smooth relief than the acidic rocky land types. Wet spots of very stony Elbert soils are included in some places.

This land type is strongly acid to slightly acid but mostly medium acid. It is moderate to high in natural fertility. For the most part, it is more difficult to work than Rocky land, hilly acidic rock phase. Runoff and internal drainage are mostly medium to rapid; they are slow in areas of this land type occupied by the Iredell and Orange soils.

Use and management.—About 20 percent of this land type is pastured, 70 percent is forested, 7 percent is idle, and 3 percent is idle, brushy, or in miscellaneous uses.

Mainly because of stoniness, Rocky land, rolling basic rock phase, is best suited to permanent pasture or forest. (Capability unit VIs-1.)

Rocky land, hilly acidic rock phase (2 to 25 percent) (Rd).—This land type consists mainly of areas of Manor, Elioak, Appling, and Louisburg soils that have numerous outcrops of bedrock and some fragments of loose stones. Outcrops and stones occupy from 15 to 40 percent of the

surface and make cultivation impractical. The soil between the rocks is variable in depth and in many other characteristics. Most slopes are rolling and have gradients of 10 to 20 percent. About 2 percent of the acreage has gradients of 7 to 14 percent. Runoff and internal drainage are medium to rapid. A few nearly level areas have wet spots. This land type is very strongly acid to medium acid.

Use and management.—About 25 percent of this land type is pastured, 15 percent is idle and brushy, 58 percent is forested, and 2 percent is cultivated.

Pastures consist mostly of broomsedge, bluegrass, whiteclover, hop clover, lespedeza, orchardgrass, and other less desirable weeds and grasses. If lime, phosphate or other fertilizer, and manure have been applied, pastures consist mainly of bluegrass, whiteclover, and orchardgrass. Pastures on this land type are generally not so good as those on soils that have formed from basic rock materials.

Because of stones, this land type is low to moderate in water-holding capacity, moderate to low in natural fertility, and poor to very poor in workability. It is best suited to pasture or forest. Lime and a complete fertilizer that contains mainly phosphorus and potassium are needed in a good fertility program. (Capability unit VIIs–1.)

Rocky land, steep acidic rock phase (25 percent+) (Re).—This land type differs from Rocky land, hilly acidic rock phase, in having steeper slopes. It consists of shallower soils, mainly of the Louisburg and Manor series. It occurs in deeply dissected uplands, mainly along large drainageways. Runoff is rapid to very rapid, and internal drainage is medium to rapid. Erosion hazards are high to very high, workability and conservability are very poor, and the range of suitability for agriculture is narrow to very narrow.

Use and management.—Most of this land type is forested, but some of it is pastured, idle, and brushy. Because of strong slopes, and shallowness, this land type is unsuited to cultivation and is best suited to pasture and forest. (Capability unit VIIs–1.)

Rolling Land, Loamy and Gravelly Sediments

Rolling land, loamy and gravelly sediments (7 to 14 percent) (Rf).—This land type is a light-colored, complex mixture of sand, gravel, and silt soil material that has formed from marine sediments on the high to moderately high Coastal Plain terraces. Most of this sediment is between the Beltsville soils of the high terraces and the Lunt soils of the moderately high terraces. Profiles with fairly definite horizonation have developed in places, but in most places only a thin A horizon has developed over various amounts of sand, silt, and gravel. Most areas are gravelly loam and gravelly sandy loam, but silt loam material and strata and pockets of clay are present, especially near borders of the associated Lunt and Beltsville soils. The underlying material is largely rounded pebbles and cobbles mixed with some sandy loam, loam, and clay loam soil material. Many pans or veins of iron are among the gravelly materials.

This land type occurs on the points of narrow ridges that extend between areas of the deeply dissected steep slopes. Small areas of severely eroded rolling and undulating land, and of loamy sediments, have been included with this land type.

This land type is strongly acid to very strongly acid throughout. The surface material and underlying material are rapidly permeable in most places. However, small compacted, slowly permeable areas occur where strata and pockets of clay and sandy clay are among the gravelly materials. Workability is very poor, fertility is low, and productivity is low to very low. Runoff is medium to rapid; internal drainage is rapid.

Use and management.—Nearly all of this land type is in cutover hardwood forest; a few acres are in homesites and permanent pasture.

Mainly because of shallowness, gravel, and rolling slopes, this land type is best suited to pasture or forest. If used for pasture, the soil needs lime, phosphate, and potash for good yields of forage. Regulation of grazing, clipping of weeds and brush, and other management practices also should be applied. Nitrogen fertilizer will be needed to help establish pasture and to maintain high production of grass forage. (Capability unit IVe–2.)

Rowland Series

The Rowland series consists of somewhat poorly drained to moderately well drained alluvial soils on first bottoms in the Piedmont Lowland (Triassic). These soils are subject to flooding and occur between and are associated with the poorly drained Bowmansville soils and the well-drained Bermudian soils. The Rowland soils resemble the Chewacla and Lindside soils but differ from them mainly in parent material. The parent alluvium for the Chewacla soils is from crystalline rocks, and that of the Lindside soils is principally from limestone. Only one soil was mapped in this series.

Rowland silt loam (0 to 2 percent) (Rg).—A profile of this soil in a cultivated area is described as follows:

0 to 10 inches, reddish-brown to brown silt loam; weak, fine, granular structure.

10 to 18 inches, predominantly brown, friable silty clay loam mottled with yellowish brown, pinkish gray, and gray; weak, fine to medium, subangular blocky structure crushes easily to granular.

18 to 35 inches, distinctly mottled yellowish-brown, strong-brown, light-gray, and red silty clay loam to clay; firm, slightly plastic; moderate, medium to coarse, subangular blocky structure; in places lower part is stratified with very fine sandy loam.

Range in characteristics.—In places along smaller upper drainageways, Rowland silt loam closely resembles the Manassas soils and gradually grades into them. Near creek banks and sandbars, very fine sandy loam textures are common. In some places very small wet spots that resemble the Bowmansville soils and well-drained areas that resemble the Bermudian soils are included with this soil. Mottles of gray are 6 to 16 inches beneath the surface in most places, but in a few areas they appear below 20 inches. A few small pebbles of quartz and shale are scattered over the surface near the mouths of intermittent drainageways and along eroded slopes.

Rowland silt loam is strongly to medium acid and medium to high in natural fertility and in supply of organic matter. The surface layer is moderately rapidly permeable; the subsoil, moderately to moderately slowly

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permeable. Runoff and internal drainage are slow. The water-holding capacity is moderate. In wet seasons the water table is in the subsoil. This soil is fairly easy to work if moisture is right, but its workability varies abruptly with slight changes in moisture conditions. Conservability is excellent. Fresh sediment is deposited by floods.

Use and management.—Most of Rowland silt loam is used for permanent pasture. About 15 percent is cultivated, 5 percent is idle, and 8 percent is forested.

In some places corn and mixed hay are grown in short cropping systems, but most cropping systems are similar to those used on the associated Penn, Bucks, and Calverton soils of the uplands. Rowland silt loam is fairly well suited to corn, to mixed hay, and to forage crops, such as ladino clover and fescue. Its suitability for crops is limited by slow internal drainage and susceptibility to flooding. Artificial drainage might increase yields, but it would only slightly broaden suitability for crops. Alfalfa is not suited, mainly because of slow internal drainage, and small grains lodge badly because of the supply of organic matter. Proper management consists of selecting varieties of crops that are tolerant of moist, cool soil and of using small amounts of lime and of fertilizer that contain mainly phosphate and potash. Nitrogen may be needed on a few areas that have been cropped continuously to corn. (Capability unit IIIw–2.)

Sassafras Series

The Sassafras series consists of deep, brown, well-drained, light-textured soils on the lower Coastal Plain. The parent material of these soils is acid clay of the marine terraces. Sassafras soils are associated with the moderately well drained Woodstown soils. They differ from the Matapeake and the Mattapex soils in having coarser texture in the subsoil. Sassafras soils are in slightly higher positions than the Woodstown and Mattapex soils, and they are better drained. They are among the best soils in the county for tilled crops.

Sassafras fine sandy loam, nearly level phase (0 to 2 percent) (Sa).—A profile of this soil under a stand of cutover brush is described as follows:

0 to 9 inches, brown to dark-brown, very friable fine sandy loam; moderate, fine to medium, granular structure; many roots.

9 to 18 inches, strong-brown to yellowish-red, light fine sandy clay loam to heavy loam; friable, slightly sticky; weak, fine, subangular blocky structure; few roots.

18 to 24 inches, strong-brown to yellowish-red fine sandy clay loam; friable, slightly sticky; weak, fine, subangular blocky structure; few roots; few, small rounded pebbles of quartz.

24 to 32 inches, faintly mottled red, yellowish-red, yellowish-brown, strong-brown, and reddish-yellow, highly stratified, light fine sandy clay loam; very weak, subangular blocky structure; few rounded pebbles of quartz.

32 to 42 inches, mottled brownish-yellow, red, yellowish-brown, and yellowish-red fine sandy loam with strata of loam, loamy fine sand, and light sandy clay loam.

Range in characteristics.—The texture of the surface layer ranges from loam to fine sandy loam but is mostly light fine sandy clay loam. Most substrata are loam, fine sandy loam, and sandy clay loam instead of sand and loamy sand. In places a few black concretions of manganese are on the surface.

The coarser areas of Sassafras fine sandy loam, nearly level phase, are adjacent to and associated with Galestown loamy fine sand. Small isolated areas of Galestown loamy fine sand and areas of the Matapeake soils are included with this soil along transitional areas.

Sassafras fine sandy loam, nearly level phase, is strongly acid throughout its entire depth. It has a moderate water-holding capacity, is easy to work and conserve, and is highly productive of a wide variety of crops under good management. Runoff is slow; internal drainage is medium. Permeability of the surface layer is very rapid, and that of the subsoil is moderate to moderately rapid. Natural fertility and the supply of organic matter are low to moderate. The retention of plant nutrients is good. Workability is very good.

Use and management.—Most of this soil is in cutover forest, and a very small acreage is in homesites and vegetable gardens. Sassafras fine sandy loam, nearly level phase, is suitable for many uses and is highly productive under good management. It requires about the same management as the Matapeake soils. However, it needs slightly more frequent fertilization than the Matapeake soils because of its coarser texture. Internal drainage and the leaching of plant nutrients are more rapid, and in most places the supply of organic matter is slightly less than in the Matapeake soils. Sassafras fine sandy loam, nearly level phase, is better suited to vegetables and is easier to work than Matapeake soils. (Capability unit I–1.)

Sassafras fine sandy loam, undulating phase (2 to 7 percent) (Sb).—This soil is similar to Sassafras fine sandy loam, nearly level phase, except that it has steeper and more undulating slopes. In addition, it has slightly thinner profile layers and in places is slightly eroded. Runoff and internal drainage are medium. The hazard of erosion is slight to moderate.

Use and management.—This soil is nearly all in cutover forest. In suitability it is very similar to the nearly level phase of Sassafras fine sandy loam but is a little more difficult to conserve. Crops yield slightly less, and they ought to be cultivated on the contour to help conserve moisture and control soil losses. (Capability unit IIe–1.)

Sassafras fine sandy loam, eroded rolling phase (7 to 14 percent) (Sc).—This soil is similar to the undulating and nearly level phases of Sassafras fine sandy loam, except that it has a thinner profile, has a slightly coarser texture, and is more severely eroded. Runoff is medium to rapid, and the hazard of erosion is moderate to high. In places the subsoil has been exposed in tillage, and shallow gullies have formed.

Use and management.—All of this soil is in cutover forest. Because of the steeper slopes and consequent hazard of erosion, Sassafras fine sandy loam, eroded rolling phase, is more difficult to work and conserve and is less productive for most crops than the nearly level and undulating phases of Sassafras fine sandy loam. In addition, it needs slightly more moisture, more organic matter, and a higher fertility level for good production.

Sassafras fine sandy loam, eroded rolling phase, is better suited to close-growing crops than to row crops. This soil should be cultivated along the contour. Crops should be grown in systems that consist of sod-forming

crops most of the time. Permanent pasture on this soil requires more frequent application of fertilizer for good production than on the Matapeake or Mattapex soils. (Capability unit IIIe-1.)

Steep Land, Loamy and Gravelly Sediments

Steep land, loamy and gravelly sediments (25 percent+) (Sd).—This land type differs from Rolling land, loamy and gravelly sediments, in that it has steeper slopes, is slightly thinner, and is more gravelly and cobbly. Runoff is rapid to very rapid, and internal drainage is medium to rapid. The soil is on the steep escarpments between the moderately low and the high marine terraces. Steep sandy sediments without gravel that occur as small areas on the breaks of the lower terraces have been included in this land type.

Use and management.—Practically all of this mapping unit is in cutover hardwood forest. Because it is gravelly, shallow, and steep, this land type is best suited to forest. (Capability unit VIIe-1.)

Swamp

Swamp (0 to 1 percent) (Se).—This mapping unit consists of wooded areas that are wet most of the time. The upper 10- to 20-inch layer is mostly dark-brown to black peat material that is high in organic matter. The underlying mineral material is mainly young, gray sandy clay loam, sandy loam, and silty clay loam sediments that are highly stratified and variable in texture. Swamp occurs in the lower Coastal Plain as small, narrow lagoons that are slightly above the water level.

Use and management.—All areas are in swamp-type shrubs and hardwood forest. The best use is forest or wildlife. (Capability unit VIIw-1.)

Very Rocky Land

Very rocky land, hilly acidic rock phase (2 to 25 percent+) (Va).—This land type is similar to Rocky land, hilly acidic rock phase, in the amount of stones on and in the soil, but it consists mainly of acidic-rock outcrops, loose stones, and boulders. In addition, most soil between the rocks is more acidic. Soil and soil materials resemble mainly the Manor, Elioak, Appling, and Louisburg soils. The large, deeply dissected areas along streams in the southeastern part of the county and along the Potomac River in the northern part are associated with the Louisburg and Manor soils. The steep slopes are mostly along river bluffs. Runoff is very rapid, and internal drainage is very rapid to slow.

Use and management.—Nearly all this land type is in forest; some of the smoother areas are pastured, idle, or brushy, or they are recreational areas. The best use is forest, which consists mainly of scarlet, red, black, white, and chestnut oaks and hickory, blackgum, sassafras, red maple, dogwood, and some Virginia pine. (Capability unit VIIs-1.)

Very rocky land, rolling basic rock phase (2 to 25 percent+) (Vb).—This land type occupies the undulating, rolling, hilly, and steep parts of the uplands. Forty to ninety percent of the land type is basic-rock outcrops, loose stones, and boulders. Among the rocks, stones, and boulders is material similar to that of the Bremo, Orange, Montalto, Iredell, and Mecklenburg soils. Most areas are in the Piedmont Lowland (Triassic) and are associated with the Iredell and Mecklenburg soils. Runoff is medium to very rapid; internal drainage, medium to slow. The water-holding capacity is very low to low, and natural fertility is very low to moderate. The soil among the rocks is very strongly acid to slightly acid. Cultivation is possible only in very small patches.

Use and management.—Nearly all this land type is forested. A few areas are idle or in permanent pasture. Forests are usually sparse, and the trees grow much more slowly than on nonstony soils. Forests consist mainly of oak, hickory, gum, locust, and walnut. Because of rockiness, this land type is suited only to forestry or to recreational and wildlife uses. (Capability unit VIIs-1.)

Wehadkee Series

The Wehadkee series consists of wet, poorly drained, gray soils that occupy flat or slightly depressed flood plains along large streams. The soils have formed in alluvium that has washed from uplands that are underlain mainly by crystalline rock material. They are subject to frequent flooding and are associated with the somewhat poorly drained Chewacla soils of the flood plains. Only one soil was mapped in this series.

Wehadkee silt loam (0 to 2 percent) (Wa).—A profile of this soil in a pastured area is described as follows:

0 to 10 inches, dominantly brown, friable silt loam faintly mottled with yellowish brown, grayish brown, light brown, and gray; moderate, fine, granular structure.

10 to 32 inches, mottled yellowish-brown, gray, and white, slightly plastic silty clay or silty clay loam; weak, medium, subangular blocky structure; small mica flakes.

32 to 40 inches, dominantly gray, light silty clay loam to silt loam soil material mottled with yellowish brown and white; friable, slightly plastic; many flakes of mica and some pockets of very fine sandy loam.

40 inches +, mixed and stratified soil materials consisting of silt loam, sandy loam, sand, and gravelly alluvium.

Range in characteristics.—The surface layer is very fine sandy loam and heavy silt loam, 6 to 14 inches thick. The subsoil is fine sandy clay loam to silty clay, 12 to 48 inches thick. Most of the subsoil is silty clay loam. The surface layer is brown and grayish brown where recent material has been deposited. In places the soil receives gravel and other soil material that is washed in from adjoining upland slopes. In other places ponded areas are present. Moderate, medium to coarse, angular blocky structure is present in some subsoil horizons.

This soil is strongly acid to medium acid. Supplies of organic matter are medium to low; natural fertility is moderate to high. Permeability to roots, water, and air is restricted by the high water table in the soil. Workability is poor; conservability, excellent.

Use and management.—About 55 percent of Wehadkee silt loam is pastured, 5 percent is cultivated, 5 percent is idle, 2 percent is brushy, and 33 percent is forested.

Because of poor drainage, this soil is difficult to work and not well suited to crops that require tillage. Frequent flooding makes it almost impossible to maintain good conditions for tillage. Heavy farm machinery can be moved over this soil only with difficulty, especially in wet seasons. Productivity is low. When the soil is

drained, permanent pasture and corn can be grown with moderate success.

For the most part, management for crops and pasture need considerable improvement. Most areas have not been fertilized, ditched, or otherwise improved. The best use for this soil under present conditions is permanent pasture. Management practices that will improve pastures consist of, (1) selecting grasses that are well suited to the soil, (2) applying moderate amounts of a complete fertilizer that is high in phosphate and potash, (3) the ditching or bedding in wet areas, (4) regulating the grazing, and (5) clipping the undesirable herbage where possible. (Capability unit IVw–2.)

Wickham Series

The Wickham series consists of deep, well-drained, brown soils that have formed in moderately young alluvium. This material consists of sand, silt, and clay that has washed from many different soils of the Piedmont Upland. For the most part, the Wickham soils are on low terraces, slightly elevated from the first bottoms. They are associated with bottom land and with upland soils. Most slopes are about 3 percent; a few are 7 percent or a little more. The Wickham soils in this county are not extensive and occur as very small, widely separated areas mainly along Difficult Run and Pohick, Occoquan, and Accotink Creeks. They are mapped with the Hiwassee soils as undifferentiated units.

Wickham and Hiwassee loams, undulating phases (2 to 7 percent) (Wb).—A profile of the component, Wickham loam, in a cultivated field, is described as follows:

0 to 10 inches, brown to dark-brown, very friable loam; strong, fine, granular structure.
10 to 28 inches, yellowish-brown to reddish-brown, friable, slightly sticky clay loam; moderate, medium, subangular blocky structure.
28 to 50 inches, mingled red, yellowish-red, and strong-brown loam to sandy clay loam soil material; river gravel and fragments of granite gneiss mixed with the soil material; lower part has some mica flakes and stratified material.

Range in characteristics.—Wickham loam is strongly acid to medium acid. Its natural fertility and supply of organic matter are moderate to high. The water-holding capacity is high. The soil is permeable to roots, water, and air. The permeability in the surface layer is rapid; that of the subsoil moderate. The erosion hazard is slight. The soil is easy to work and to manage and is productive of most crops commonly grown in the county.

The Hiwassee soil in this complex is deep, red, and well drained. It occupies high terraces, mainly along Occoquan Creek. The surface layer is a brown to reddish-brown loam to silt loam; the subsoil is a thick, red clay.

The Hiwassee and the Wickham soils are associated and are similar in characteristics that are significant in management. The Hiwassee is redder, has a more strongly developed subsoil, and occupies higher stream terraces. Areas of it are small and widely scattered.

Use and management.—Most of Wickham loam is in cultivation. The management practices used on it are similar to those used on the associated upland soils.

Because of its very favorable depth, slope, water-holding capacity, permeability, natural fertility and supply of organic matter, this soil is well suited to the crops grown in the county. Yields are high if the soil is given management similar to that used on the Chester and Eubanks soils, neither of which were mapped in Fairfax County.

Most areas of the Hiwassee soil are idle or in building sites. The management they should have is similar to that of the Wickham soils. However, the Hiwassee soil is more erosive, more difficult to work, and slightly less favorable for crops. (Capability unit IIe–1.)

Woodstown Series

The Woodstown series consists of deep, light-colored, moderately well drained soils that have developed from sand, silt, and clay on the lower Coastal Plain. The soils are coarse textured and are associated with the Sassafras soils. They are more nearly level, slightly lower in elevation, and less well drained than the Sassafras soils. The Woodstown soils resemble the Mattapex soils in color but have a coarser textured surface layer and subsoil.

Woodstown fine sandy loam, nearly level phase (0 to 2 percent) (Wc).—A profile of this soil in a wooded area is described as follows:

0 to 4 inches, very dark brown to grayish-brown, very friable fine sandy loam; upper inch is dark grayish brown; weak, fine, granular structure.
4 to 10 inches, yellowish-brown, very friable fine sandy loam; weak, fine, granular structure; layer slightly streaked with darker colored material from the horizon above it.
10 to 19 inches, brownish-yellow, friable, light fine sandy clay loam to sandy clay loam; a few distinct mottles of yellowish brown; weak, fine, subangular blocky structure; few small pebbles of quartz.
19 to 38 inches, yellow sandy clay loam mottled with strong brown and yellowish brown; friable, slightly plastic, slightly sticky; weak to moderate, medium, subangular blocky structure; slightly compact when dry; few small pebbles of quartz.
38 to 58 inches, yellowish-brown to light yellowish-brown, very friable to loose sandy loam and sandy soil material; few angular pebbles of quartz.

Range in characteristics.—The texture of the surface layer ranges from very fine sandy loam to sandy loam; that of the subsoil is sandy loam, loam, light sandy clay, and sandy clay loam. The underlying material is a mixture of sand, loamy sand, and sandy loam. In some places, lenses of sandy clay loam are present. The thickness of the solum usually ranges between 26 and 48 inches.

Woodstown fine sandy loam, nearly level phase, is strongly to very strongly acid throughout. Internal drainage and runoff are medium to slow. Permeability of the surface layer is rapid to very rapid; that of the subsoil, moderate to slow. Natural fertility is low, and conservability is very good.

Use and management.—Nearly all of this soil is in cutover hardwood forest. Because of smooth relief and friable sandy condition, the soil is easy to work and is suitable for most crops commonly grown in the county except alfalfa. It is better suited to vegetables and other row crops than to hay. High yields of small grains can be produced under good management.

The soil needs organic matter, lime, phosphate, nitrogen, and potash for high productivity. The erosion

hazard is very slight. Simple management is needed to control runoff and loss of plant nutrients through leaching. (Capability unit IIw-2.)

Woodstown fine sandy loam, undulating phase (2 to 7 percent) (Wd).—This soil is essentially the same as Woodstown fine sandy loam, nearly level phase, except that it has steeper slopes and a slightly thinner profile. Runoff is medium, and internal drainage is medium to slow. The hazard of erosion is slightly greater than on Woodstown fine sandy loam, nearly level phase.

Use and management.—Nearly all of this soil is in cutover hardwood forest. In management and use suitability, this soil is similar to the nearly level phase of Woodstown fine sandy loam. (Capability unit IIe-3.)

Worsham Series

The Worsham series consists of wet, poorly drained soils commonly called gray crawfish land. These soils are associated with the Elioak, Glenelg, Manor, Meadowville, Appling, and Glenville soils. The Worsham soils occupy low, flat, depressed areas. In most places the soils were derived from fine local colluvial and alluvial material that has washed from the associated soils. However, some areas on upland flats have formed mostly in residual material. The Worsham soils resemble the Croton soils of the Piedmont Lowland (Triassic) in drainage, relief, and position, but they were derived from different parent material. The Croton soils have formed in material that washed from soil underlain by sandstone and shale.

Worsham silt loam (0 to 2 percent) (We).—A profile of this soil in a cultivated area is described as follows:

0 to 7 inches, grayish-brown, friable silt loam faintly mottled with light gray and white; moderate, medium, granular structure; in pastured areas, the upper 2 inches is darker brown.

7 to 15 inches, mottled light-gray, strong-brown, and yellowish-brown silty clay or heavy silty clay loam; slick, slightly plastic; strong, medium, subangular blocky structure in the upper part and strong, coarse, blocky or prismatic in the lower part; many rounded concretions in upper 3 inches.

15 to 36 inches, predominately gray, heavy silty clay loam distinctly mottled with yellowish brown, strong brown, and olive gray; strong, coarse, subangular blocky structure; lower 3 inches is silt loam.

36 to 70 inches, mottled strong-brown, yellowish-brown, gray, and yellowish-red, highly micaceous silt loam soil material; particles of partly decomposed schist and quartz mixed with the soil material; friable, slick.

Range in characteristics.—The surface layer ranges from 6 to 12 inches in thickness; is mottled gray, brown, and yellowish brown to brown in color; and is silt loam or loam in texture. The texture of the subsoil ranges from friable silty clay loam to plastic silty clay. The texture sequence is variable in the lower part of the profile. Parent material may be at a depth of 24 to 80 inches, but in most places it is at a depth of about 50 inches.

Worsham silt loam is strongly acid. It is low to moderately high in organic matter and low to moderate in natural fertility. Runoff is slow to very slow; internal drainage is very slow. Permeability is moderate to moderately slow in the subsoil, but the high water table greatly retards the entrance of water and air.

Use and management.—Approximately 30 percent of Worsham silt loam is in forest, 6 percent is idle, 62 percent is in pasture, and 2 percent is in crops.

Worsham silt loam is best suited to permanent pasture, if it has not been drained. Even so, drainage is needed in some places to obtain the best pasture. The soil is well suited to ladino clover and fescue, but seeding these is difficult unless the soil is drained.

Pasture management similar to that described for Glenville silt loam should give good results. Lime, liberal amounts of fertilizer that contains mostly phosphate and potash, mixtures of suitable grasses, regulated grazing, control of weeds, and some ditching in the wetter areas should provide good pasture. Cattle should not graze on pastures in wet periods because trampling is detrimental to the soil structure and pasture plants. (Capability unit Vw-1.)

Use and Management of the Soils

This section consists of three parts. The first discusses general principles of soil management; the second explains how soils are grouped according to their capability and describes the capability units; and the third gives productivity ratings for the soils at two levels of management.

General Principles of Soil Management

Estimating the need of lime, phosphorus, and potassium

Each soil contains some supply of the nutrients growing plants need. Thus, each soil has some natural fertility. This natural fertility was estimated for each soil in the section "Descriptions of the Soils." The estimates of natural fertility, when supplemented with soil tests for plant nutrients, knowledge about past management, and information about the level of yield expected, make it possible to judge the need for additional plant nutrients on a particular soil. In deciding the actual application of fertilizer, however, other factors are to be considered.

One part of a field is commonly more responsive to lime or to fertilization than another, because a field frequently contains more than one soil. The Elioak silt loams, for example, respond less to potash than do the Appling gritty loams. Sassafras fine sandy loam, nearly level phase, because of is greater water-supplying capacity, is more capable of responding to heavy fertilization than is the eroded rolling phase. For this reason, the soil descriptions and soil tests for fertility should be studied before fertilizer is applied.

The level of management the operator wishes to use will partly determine the amount of plant nutrients that should be applied. Also to be considered are available capital and market outlook.

Organic matter and nitrogen

Most soils in Fairfax County are deficient in organic matter and nitrogen. The application of nitrogen to crops, except legumes, not only increases yields but also increases the amount of available organic material, which can be returned to the soil. Organic material, in turn,

improves the water-holding capacity and tilth and helps to reduce soil losses due to erosion. Unlike phosphorus and potassium, nitrogen is not a constituent of the soil minerals. It comes largely from plant remains, especially those of legumes, and from commercial fertilizer. Animal manure furnishes considerable nitrogen and organic matter. The use of crop residue, manure, and nitrogen depends largely upon the type of crop to be grown.

A complete fertilizer (one containing nitrogen, phosphorus, and potassium) should be used with small grains, and a mineral fertilizer (potassium and phosphorus) with legumes at the time of seeding and as a topdressing. Sandy soils should receive additional nitrogen as a side dressing for corn and as a topdressing for winter wheat and barley. Sandy soils generally are more deficient in potassium than the soils higher in clay.

Rotation of crops

A good rotation adds organic matter to the soil at the opportune time. For example, legume residue or green-manure crops can be plowed under to increase the yield of corn, which is the crop that has the highest acre value. Good rotations also help to control erosion, soil-borne diseases, and weeds and to maintain good soil structure. They also distribute the drain of plant nutrients over a longer period of time. This distribution allows more time for the soil to furnish nutrients through the normal process of weathering. In Fairfax County, a good rotation should include alfalfa, red clover, ladino clover, or lespedeza. The selection of the legume will depend mainly on the kind of soil and the level of soil productivity maintained.

Control of erosion

More than 50 percent of Fairfax County is classified as moderately eroded. Very little is severely gullied. The erosion shows the need for improved management. If properly managed, the steep soils should be in forest or pasture, and protected from fire and overgrazing. The sloping soils that are to be cultivated should be used for crop rotations that will improve them and minimize soil losses. A rotation consisting of a year of corn, a year of wheat, and 3 years of alfalfa, together with good management and adequate fertilization, is effective on many soils having slopes as much as 15 percent. Adequate fertilization is a very essential part of good management on sloping soils, whether cultivated or in permanent pasture. A cover of growing plants and extensive development of plant roots can keep soil loss at a low level. Contour tillage, stripcropping, and grassed drainageways are required in many situations to control erosion adequately.

Artificial drainage

Crops growing on wet soils or on slowly permeable soils are more affected by unfavorable seasonal conditions than are those growing on permeable soils or on artificially drained soils. The effects of excess moisture can be lessened by proper fertilization and by choosing crops that can tolerate wet soils. Many imperfectly drained or poorly drained soils would be potentially excellent for pasture or cultivation if they could be drained. Much poorly drained bottom land is idle. Each wet area should be studied to determine the possibility of establishing drainage. Adequate drainage outlets are essential for both surface- and tile-drainage systems. Permeability of the subsoil is very important to the efficiency of tile-drainage systems. The natural drainage condition of each soil is given in the section "Descriptions of the Soils." The area in Fairfax County that would respond to adequate drainage is only about 17,011 acres, or 6.4 percent of the county.

Tillage

Soils that are expected to produce high yields must be kept in good physical condition. Improper tillage can cause the deterioration of soil structure and the loss of

TABLE 4.—*Suggested crops and*

Capability class and subclass	Capability unit number and descriptive name	Crop suitability
Class I. Soils that have few limitations that restrict their use. (no subclasses).	I–1: Level to nearly level, deep, well-drained, permeable, moderately fertile soils of the lower Coastal Plain.	Corn, soybeans, wheat, barley, and oats; alfalfa, lespedeza, red clover, whiteclover, orchardgrass, fescue for hay and pasture; many kinds of truck crops.
Class II. Soils that have some limitations that reduce the choice of plants or require moderate conservation practices.		
Subclass IIe.—Soils subject to moderate erosion.	IIe–1: Undulating, deep, well-drained, permeable, fertile soils of the Piedmont Upland, Piedmont Lowland, and Coastal Plain.	Same as for capability unit I–1; the sandier soils are favored for potatoes and some truck crops.
	IIe–2: Undulating, deep, well-drained, permeable, moderately fertile soils of the Piedmont Upland, Piedmont Lowland, and upper Coastal Plain.	Same as for capability unit I–1; the sandier soils are favored for potatoes and some truck crops.

organic matter. Many clayey soils, for example, must be cultivated within a narrow range of moisture content to prevent puddling and damage to structure. The deterioration of soil structure is gradual and not easily noticed. Consequently, many farmers are not aware of damage until the soils have seriously deteriorated. The structure of damaged soils can be improved by adding organic matter and growing sod-forming crops. Tillage implements that incorporate organic matter into the surface horizon help to maintain the soil in good physical condition. Soils should not be overcultivated.

Capability Groups of Soils

The capability classification is a grouping of soils that shows, in a general way, how suitable they are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment.

In this system all the kinds of soil are grouped at three levels, the capability class, subclass, and unit. The eight capability classes in the broadest grouping are designated by Roman numerals I through VIII. In class I are the soils that have few limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. In class VIII are soils and landforms so rough, shallow, or otherwise limited that they do not produce worthwhile yields of crops, grazing, or wood products.

The subclasses indicate major kinds of limitations within the classes. Within most of the classes there can be up to four subclasses. The subclass is indicated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* means that water in or on the soil will interfere with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony, and *c*, used in only some parts of the country, indicates that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few or no limitations. Class V can contain, at the most, only subclasses *w*, *s*, and *c*, because the soils in it have little or no erosion hazard but have other limitations that limit their use largely to pasture, range, woodland, or wildlife.

Within the subclasses are the capability units, groups of soils enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about the management of soils. Capability units are generally identified by numbers assigned locally, for example, IIe-1 or IIIe-2.

Soils are classified in capability classes, subclasses, and units in accordance with the degree and kind of their permanent limitations; but without consideration of major and generally expensive land-forming that would change the slope, depth, or other characteristics of the soil; and without consideration of possible but unlikely major reclamation projects.

Management by capability units

For the purpose of discussing general agricultural management, the soils of Fairfax County have been placed in 7 capability classes; numerous subclasses, depending on the kind of limitation; and 25 capability units. The drainage referred to is the natural drainage of the soil.

Table 4 describes the capability classes, subclasses, and units. In addition, it gives a brief description of soil characteristics in each capability unit, the use suitability of each unit, and the crops and management suggested for each unit. Following the table, each capability unit is described.

management according to capability units

Suggested crop rotations	Fertilizer and lime requirements	Tillage requirements	Supplementary water-control practices needed
1 to 3 years of corn, 1 year of a small grain, and 1 year of red clover or mixed hay.	Nitrogen, phosphate, potash, and organic matter; moderate amounts of lime; responds well to heavy fertilization.	Good tilth not difficult to maintain; moderate amounts of organic matter for silt loam improve infiltration.	None.
(a) 1 year of corn, 1 year of a small grain, and 1 to 3 years of mixed hay including red clover, or (b) 1 year of corn, 1 year of a small grain, and 2 to 5 years or more of alfalfa, or (c) on the more nearly level parts 2 years of corn, 1 year of a small grain, and 2 years of mixed hay.	Nitrogen, phosphate, potash, and organic matter; moderately heavy lime requirement; responds well to heavy fertilization.	Same as for capability unit I-1	Contour cultivation on slopes; permanent sod in main waterways.
Same as for capability unit IIe-1	Same as for capability unit IIe-1 except that heavier fertilization is required for comparable yields.	More organic matter needed for maintenance of good tilth and infiltration than for capability units I-1 and IIe-1.	Same as for capability unit IIe-1.

TABLE 4.—*Suggested crops and*

Capability class and subclass	Capability unit number and descriptive name	Crop suitability
Class II—Continued Subclass IIe—Continued	IIe-3: Undulating, deep, well drained to moderately well drained, slowly permeable, low-fertility soils of the Piedmont Upland, Piedmont Lowland, and upper Coastal Plain.	Same as for capability unit I-1 except that alfalfa is not as long lived because of occasional wet periods; Woodstown soil is exceptionally good for truck crops.
Subclass IIw.—Soils that have moderate limitations because of excess water.	IIw-1: Gently sloping, well drained to moderately well-drained, permeable, fertile soils on young local alluvium and colluvium.	Most crops except small grains, which lodge; alfalfa yields well, but stands deteriorate after a few years.
	IIw-2: Nearly level, deep, moderately well drained, permeable, low-fertility soils of the Piedmont Upland, Piedmont Lowland, and upper Coastal Plain; good water-supplying capacity.	Same as for capability unit I-1 but alfalfa is not so long lived because of occasional wet periods; Woodstown soil is exceptionally good for truck crops.
	IIw-3: Nearly level to level, deep, well-drained, permeable, fertile soils on first bottoms subject to overflow.	Most field, forage, and truck crops except alfalfa and small grains; alfalfa produces well for a few years; small grains lodge badly.
Class III. Soils that have severe limitations that reduce the choice of plants, or require special conservation practices, or both.		
Subclass IIIe.—Soils subject to severe erosion if they are cultivated and not protected.	IIIe-1: Rolling, moderately deep to deep, well-drained, moderately permeable soils of low to moderate fertility on the Piedmont Upland, Piedmont Lowland, and Coastal Plain.	All crops commonly grown in county; same as for capability unit I-1.
	IIIe-2: Undulating, shallow, well-drained to excessively drained, moderately to rapidly permeable, low-fertility soils of the Piedmont Lowland.	Best suited to small grains, red clover, lespedeza, fescue, orchardgrass; less well suited to corn, soybeans, and vegetables, especially on the gravelly and more eroded areas.
Subclass IIIw.—Soils that have severe limitations because of excess water.	IIIw-1: Nearly level to undulating, moderately well drained to somewhat poorly drained, moderately slowly permeable, low-fertility soils with moderately thick root zones, in the Piedmont and on higher parts of the Coastal Plain.	Corn, soybeans, small grains; white, alsike, and red clovers, lespedeza, cowpeas, fescue, orchardgrass, and timothy for hay and pasture; alfalfa is productive but short lived.
	IIIw-2: Nearly level to level, deep, moderately well drained to somewhat poorly drained, permeable, fertile soils of the first bottoms.	Corn, soybeans; white, red, and alsike clovers, cowpeas, fescue, and orchardgrass for hay and pasture.
	IIIw-3: Nearly level to level, somewhat poorly drained, moderately slowly permeable, low-fertility soils of the Coastal Plain; plastic subsoil.	Corn, soybeans; mixed legumes and grasses for hay and pasture; small grains moderately suited.
Subclass IIIs.—Soils that are limited in capacity to hold moisture.	IIIs-1: Nearly level, deep, excessively drained, very rapidly permeable, low-fertility soils of the lower Coastal Plain; low in water-supplying capacity.	Melons, potatoes, and peanuts; fescue, bermudagrass, and ryegrass.
Class IV. Soils that have very severe limitations that restrict the choice of plants, require careful management, or both.		
Subclass IVe.—Soils subject to very severe erosion if they are cultivated and not protected.	IVe-1: Rolling, moderately deep to deep, well-drained, permeable, low-fertility soils of the Piedmont Upland.	Small grains, alfalfa, lespedeza, red clover, orchardgrass, fescue, and timothy; corn fairly well suited.

management according to capability units—Continued

Suggested crop rotations	Fertilizer and lime requirements	Tillage requirements	Supplementary water-control practices needed
1 year of corn, 1 year of a small grain, and 1 to 3 years of red clover or mixed hay.	Same as for capability unit IIe-1 except that heavier fertilization is required for comparable yields.	More organic matter needed for maintenance of good tilth and infiltration than for capability units I-1 and IIe-1.	Same as for capability unit IIe-1.
(a) 1 year of corn, 1 year of red clover or mixed hay, or (b) 1 or 2 years of corn, 1 year of a small grain, 1 or 2 years of red clover or mixed hay.	Moderate amounts of nitrogen, phosphate, potash, lime, and organic matter.	Moderate amounts of organic matter allow good tilth to be easily maintained; seepage commonly delays spring tillage and planting.	Permanent grass in main waterways; drainage to remove seep water may be practical in places.
Suited to frequent row crops if fertility is maintained and organic matter is returned to the soil; 1 to 3 years of row crops, 1 year of a small grain, and 1 year of red clover or mixed hay.	If intensively cropped, heavy applications of all plant nutrients; moderate amounts of lime; maintain organic matter.	Moderate amounts of organic matter allow good tilth to be easily maintained; tillage somewhat more delayed by wetness than on coarser, better drained soils.	Erosion is not a severe hazard; internal drainage is somewhat impaired but does not justify artificial drainage.
Suited to frequent row crops; 1 to 3 years of corn and 1 year of mixed hay.	Lime required for Bermudian soil, but not for Huntington; complete fertilizer required in somewhat lesser amounts than on low-fertility soils.	Good tilth is easily maintained; wetness commonly delays field operations early in spring; soils warm more slowly than the higher coarser textured soils.	Practically none; overflow is somewhat a hazard.
(a) Small grain and hay, or (b) 1 year of a row crop, 1 year of a small grain, and 3 or 4 years of alfalfa or red clover and grass harvested as hay.	Lime, heavy applications of mixed fertilizer, and some organic matter needed to maintain an effective vegetative cover and to obtain high yields.	The silt loam types clod easily when plowed in a moderately wet condition; break to coarse hard fragments when plowed in a very dry condition.	Contour cultivation and stripcropping; permanent sod in main waterways.
1 year of corn, 1 year of a small grain, and 1 to 3 years of red clover and mixed hay or alfalfa.	Moderately heavy applications of lime and a complete fertilizer; moderate amounts of organic matter; low water-holding capacity limits ability to respond.	Good tilth is not difficult to maintain; gravel in the Catlett soil interferes with some field operations.	Contour cultivation; permanent sod in main waterways.
(a) 1 year of corn, 1 year of a small grain, and 1 to 3 years of mixed hay, or (b) 1 year of corn, 1 year of soybeans, and 2 years of mixed hay.	Moderate applications of lime and organic matter; response is good to moderately heavy fertilization.	Good tilth fairly easily maintained; avoid tillage when soil is wet.	Wet or slightly depressed parts respond somewhat to surface or tile drainage; less response to irrigation than from better drained and sandier soils.
1 or 2 years of corn or soybeans, and 1 or 2 years of clover or mixed hay.	Some lime and organic matter; moderate fertilization; good supply of moisture makes high yields possible if management is good.	Careful cultivation needed to avoid clodding under wet conditions; wetness commonly delays fieldwork early in spring.	Good response to surface and tile drainage.
(a) 1 year of corn followed by oats seeded to lespedeza, or (b) 1 year of corn followed by oats, and 1 year of soybeans followed by crimson clover or vetch.	Some lime and complete fertilization; some organic matter.	Careful cultivation needed to avoid clodding; wetness commonly delays field operations.	Good response to surface and tile drainage, although subsoil is slowly permeable.
Suited to frequent row crops-------	Frequent and heavy applications of fertilizer; moderate amounts of lime; some organic matter.	Very easily tilled; soil can be worked soon after it is wetted; warms early in spring.	Responds well to irrigation.
(a) 1 year of corn, 1 year of a small grain, and 3 or 4 years of alfalfa or grass and legume hay, or (b) 1 year of a small grain, 3 to 5 years of alfalfa or grass and legume hay.	Moderate amounts of lime and organic matter; moderately heavy applications of a complete fertilizer.	The eroded areas clod easily and have a narrow range of moisture in which they can be worked well.	Contour cultivation and stripcropping where feasible; permanent sod in main waterways.

TABLE 4.—*Suggested crops and*

Capability class and subclass	Capability unit number and descriptive name	Crop suitability
Class IV—Continued Subclass IVe—Continued	IVe-2: Rolling, shallow, excessively drained, moderately slowly permeable, low-fertility soils of the Piedmont and the high stream terraces.	Small grains; lespedeza, red clover, fescue, and orchardgrass for mixed hay and pasture.
	IVe-3: Undulating to rolling, moderately deep, moderately well drained to somewhat poorly drained, moderately fertile soils of the Piedmont Upland and Piedmont Lowland; plastic subsoil.	Corn, soybeans, and small grains; lespedeza, white and alsike clovers, fescue, and timothy for hay and pasture; orchardgrass suitable on better drained sites.
Subclass IVw.—Soils that have very severe limitations for cultivation because of excess water.	IVw-1: Undulating, moderately deep, moderately well drained to somewhat poorly drained, moderately fertile soils of the Piedmont Upland; plastic subsoil.	Same as for capability unit IVe-3
	IVw-2: Nearly level, deep, poorly drained, fertile, permeable soils on bottoms subject to flooding.	Whiteclover, bluegrass, and fescue; corn, soybeans, and small grain are suited in adequately drained areas.
Class V. Soils that have little or no erosion hazard but have other limitations that are impractical to remove that limit their use largely to pasture, range, woodland, or wildlife food and cover.		
Subclass Vw.—Soils too wet for cultivation; drainage or protection not feasible.	Vw-1: Nearly level to gently undulating, deep, poorly drained, slowly permeable, medium- to low-fertility soils in depressions.	Permanent pasture consisting of whiteclover and fescue; corn suited in adequately drained parts.
Class VI. Soils that have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.		
Subclass VIe.—Soils severely limited, chiefly by risk of erosion if protective cover is not maintained.	VIe-1: Hilly, deep, well-drained, permeable, medium- to low-fertility soils of the Piedmont Upland.	Whiteclover, lespedeza, orchardgrass, and fescue.
	VIe-2: Hilly, shallow, excessively drained, low-fertility soils of the Piedmont and the higher Coastal Plain.	Same as for capability unit VIe-1
Subclass VIs.—Soils generally unsuitable for cultivation and limited for other uses by their moisture capacity, stones, or other features.	VIs-1: Undulating to rolling, stony, shallow to very shallow, moderately fertile soils of the Piedmont Upland.	Bluegrass, fescue, whiteclover, and lespedeza for permanent pasture.
Class VII. Soils that have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.		
Subclass VIIe.—Soils very severely limited, chiefly by risk of erosion if protective cover is not maintained.	VIIe-1: Steep, shallow, low-fertility soils with a low water-supplying capacity.	Native grasses and trees
Subclass VIIw.—Soils very severely limited by excess water.	VIIw-1: Level, permanently wet areas	Native grasses and trees
Subclass VIIs.—Soils very severely limited by moisture capacity, stones, or other soil features.	VIIs-1: Rocky land with little soil material.	Native vegetation

management according to capability units—Continued

Suggested crop rotations	Fertilizer and lime requirements	Tillage requirements	Supplementary water-control practices needed
1 year of a small grain, 3 to 5 years of mixed hay or pasture.	Same as for capability unit IVe–1; smaller supply of available moisture limits the ability to respond.	Same as for capability unit IVe–1.	Contour tillage; permanent sod in main waterways.
1 year of corn, 1 year of a small grain, 2 or 3 years of mixed hay or pasture.	Same as for capability unit IVe–1.	Do not cultivate soils when too wet.	Contour cultivation and, where practical, stripcropping; permanent sod in main waterways.
1 year of corn, 1 year of a small grain, and 1 to 3 years of mixed hay or pasture.	Same as for capability unit IVe–1.	Do not cultivate when too wet; field operations commonly delayed by wetness in spring.	Contour cultivation; permanent sod in waterways.
(a) permanent pasture, or (b) 1 to 3 years of corn or soybeans, 1 year of a small grain, 1 or more years of hay or pasture.	Some lime and phosphate for pasture; complete fertilizer for crops; large water-supplying capacity makes high yields possible if management and drainage are adequate.	Wetness commonly delays field operations; careful cultivation needed to avoid clodding.	Ditch and tile drainage; overflow is a general hazard.
Permanent pasture	Lime and at least phosphate and potash for legumes and grasses; also nitrogen if legumes are not grown.	Same as for capability unit IVw–1.	Ditch drainage; tile drainage generally not practical because of very slow percolation.
Whiteclover, fescue, and orchardgrass for permanent pasture.	Moderate amounts of lime and phosphate; some potash.	Slopes greatly interfere with tillage; soil should be tilled only when pasture renovation is required.	All tillage should be on the contour.
Same as for capability unit VIe–1	Same as for capability unit VIe–1	Same as for capability unit VIe–1.	Same as for capability unit VIe–1.
Permanent pasture	Periodic applications of lime, phosphate, and potash; also nitrogen if legumes are not grown.	Not suited to cultivation	Maintain good vegetative cover; avoid overgrazing.
None	None	None	Maintain good vegetative cover.
None	None	None	None.
None	None	None	Maintain good vegetative cover.

Capability Unit I–1

This unit consists of level to nearly level, deep, well-drained, permeable, moderately fertile soils of the lower Coastal Plain.

The 7- to 10-inch surface layer of these soils is brown fine sandy loam to silt loam. The subsoil is strong-brown to yellowish-red, friable to firm fine sandy clay loam to silty clay loam. The soils are strongly acid, and the surface layer is medium in organic matter. The capacity for supplying moisture that plants can use is medium to high. The erosion hazard is low. The soils in this unit are among the most desirable in the county. They respond well to management, are suited to a wide range of crops, and can be cropped intensively if management is good.

The soils of this capability unit are:

Matapeake silt loam, nearly level phase.
Sassafras fine sandy loam, nearly level phase.

Capability Unit IIe–1

This capability unit consists of undulating, deep, well-drained, permeable, fertile soils of the Piedmont Upland, Piedmont Lowland, and Coastal Plain.

The 7- to 9-inch surface layer of these soils is brown fine sandy loam to silt loam. The subsoil is strong-brown to yellowish-red, friable to firm fine sandy clay loam to clay. The root zone is more than 30 inches deep. The soils are strongly to very strongly acid, and the surface layer contains a medium amount of organic matter. Their capacity to supply available moisture for growing plants is medium to high. Runoff is a moderate hazard. These soils are productive under good management. They are suited to a wide variety of crops and are not difficult to maintain at a high level of productivity.

The soils of this capability unit are:

Birdsboro silt loam, eroded undulating phase.
Bucks silt loam, eroded undulating phase.
Bucks loam, undulating phase.
Enon silt loam, eroded undulating phase.
Lloyd loam, eroded undulating phase.
Matapeake silt loam, undulating phase.
Sassafras fine sandy loam, undulating phase.
Wickham and Hiwassee loams, undulating phases.

Capability Unit IIe–2

This capability unit consists of undulating, deep, well-drained, permeable, and moderately fertile soils. These soils are on the Piedmont Upland, Piedmont Lowland, and the upper Coastal Plain.

The 7- to 10-inch surface layer of these soils is yellowish-brown fine sandy loam to silt loam. The subsoil is strong-brown to red, friable to firm sandy clay loam to silty clay loam. The soils are strongly to very strongly acid, and the supply of organic matter is medium to low. The root zone is 30 to 48 inches deep. The capacity to supply available moisture for plants is medium to high. Runoff is a moderate hazard.

These soils differ from those of capability unit IIe–1 chiefly in that they are lower in natural fertility. They are suited to a wide range of crops and respond well to management. High fertility is a little more difficult to maintain in these soils than in the soils of capability unit IIe–1.

The soils of this capability unit are:

Appling gritty loam, eroded undulating phase.
Brecknock silt loam, eroded undulating phase.
Brecknock loam, undulating phase.
Elioak silt loam, eroded undulating phase.
Glenelg silt loam, undulating phase.
Lunt fine sandy loam, undulating phase.

Capability Unit IIe–3

This capability unit consists of undulating, deep, well drained to moderately well drained, slowly permeable, low-fertility soils of the Piedmont Upland, Piedmont Lowland, and upper Coastal Plain.

The 7- to 10-inch surface layer of these soils is grayish-brown fine sandy loam to silt loam, and the subsoil is yellowish-brown, friable to firm clay loam to silty clay loam. All soils are mottled below a depth of 20 to about 30 inches from the surface. The Woodstown soil is moderately permeable; the others are moderately slowly to slowly permeable. The soils are strongly to very strongly acid; supplies of organic matter are low. The capacity to supply available moisture for plants is moderate to high. Runoff is a moderate hazard on the more strongly sloping parts.

These soils are suited to a fairly wide range of crops and respond well to management. The somewhat impaired internal drainage limits the depth of the root zone for alfalfa and other moisture-sensitive crops. Yields may be low in exceptionally wet years.

The soils of this capability unit are:

Fairfax silt loam, undulating phase.
Fairfax loam, undulating phase.
Mattapex silt loam, undulating phase.
Mayodan silt loam, undulating phase.
Woodstown fine sandy loam, undulating phase.

Capability Unit IIw–1

This unit consists of gently sloping, deep, well drained to moderately well drained, permeable, fertile soils on young local alluvium and colluvium.

The 10- to 20-inch surface layer of these soils is brown silt loam; the subsoil is reddish, friable silty clay loam to a depth of 27 inches or more. The depth of the root zone is more than 36 inches. The soils are medium to strongly acid and contain moderately low to moderately large amounts of organic matter. They have a high capacity to supply available moisture for plants. Runoff is a slight erosion hazard. The Glenville soil may require some surface drainage.

These soils are among the most desirable for general farm crops and pasture. They are especially suited to corn, pasture, and other plants that require moisture late in summer and early in fall. Small grains tend to lodge; alfalfa grows well for only a few years. These soils respond well to management and are not difficult to maintain at a high level of productivity.

The soils of this capability unit are:

Glenville silt loam.
Manassas silt loam.
Meadowville silt loam.

Capability Unit IIw–2

This unit consists of nearly level, deep, moderately well drained, permeable soils of low fertility. They are on the Piedmont Upland, the Piedmont Lowland, and the upper Coastal Plain.

The 7- to 10-inch surface layer of these soils is brown to very dark brown fine sandy loam to silt loam; the subsoil is yellowish-brown, friable to firm clay loam to silty clay loam. All the soils are mottled below a depth of 20 to 30 inches. The Woodstown soil is moderately permeable; the Mattapex is slowly to moderately slowly permeable. Runoff is not a hazard. The soils are strongly to very strongly acid and contain low amounts of organic matter. They have a high available moisture-holding capacity. Excess soil moisture sometimes interferes with field operations and reduces plant growth.

These productive soils are easily managed, although excess soil water is a hazard at times. Because of good tilth and high capacity to supply available water, the soils are very responsive to heavy applications of the required plant nutrients.

In this capability unit are:

Mattapex silt loam, nearly level phase.
Woodstown fine sandy loam, nearly level phase.

Capability Unit IIw-3

This capability unit consists of nearly level to level, deep, well-drained, permeable, fertile soils on first bottoms subject to overflow.

The soils are reddish-brown to very dark grayish-brown, friable silt loam to a depth of 36 inches or more. The Bermudian is medium to strongly acid, and the Huntington is mainly slightly acid to slightly alkaline. Organic matter is moderately high in supply. The capacity to supply available moisture for plants is high.

These soils are naturally productive and can be easily maintained in this condition if management is good. A high state of fertility is easier to maintain than in the less fertile soils of the uplands. The soils are easily worked and are suited to intensive cultivation. However, overflow and temporary wetness may interfere with field operations. Their favorable moisture-supplying capacity makes these soils especially desirable for corn and pasture. Overflow and high humidity, which are characteristic of bottom lands, cause these soils to be somewhat unfavorable for fall-sown small grains, alfalfa, and long-season, high-value crops easily damaged by overflow. Some areas of these soils are frequently overflowed, and these are restricted in their crop suitability. However, if any of these areas were completely protected from overflow, they would qualify for capability class I.

The soils of this capability unit are:

Bermudian silt loam.
Huntington silt loam.

Capability Unit IIIe-1

This capability unit consists of rolling, moderately deep to deep, well-drained, moderately permeable soils of low fertility. These soils are on the Piedmont Upland, Piedmont Lowland, and Coastal Plain.

The 7- to 9-inch surface layer is approximately dark-brown silt loam to fine sandy loam. The subsoil is friable to firm sandy clay loam to silty clay loam. All of the soils are strongly to very strongly acid and low in organic matter. The capacity to supply available moisture for plants is medium. The erosion hazard is high.

The hazard of erosion and the low capacity to supply moisture limit the crop suitability of soils in this group. Row crops cannot be grown frequently, because living vegetation should cover the soils most of the time. Field operations, cropping systems, and fertilizing practices should be carefully planned to control erosion and to maintain reasonably high productivity. The soils are suited to a fairly wide range of crops, but their small capacity for supplying moisture limits their productivity to some extent.

The soils of this capability unit are:

Appling gritty loam, eroded rolling phase.
Brecknock silt loam, eroded rolling phase.
Brecknock loam, eroded rolling phase.
Elioak silt loam, eroded rolling phase.
Enon silt loam, eroded rolling phase.
Fairfax silt loam, eroded rolling phase.
Glenelg silt loam, eroded rolling phase.
Lunt fine sandy loam, eroded rolling phase.
Montalto silt loam, eroded rolling phase.
Sassafras fine sandy loam, eroded rolling phase.

Capability Unit IIIe-2

This capability unit consists of undulating, shallow, well-drained to excessively drained, moderately permeable to rapidly permeable, low-fertility soils on the Piedmont Lowland.

The 5- to 8-inch plow layer in these soils is pale-brown silt loam to fine sandy loam. Under this is friable loam or silt loam. Shaly material is at a depth of about 14 inches. The soils are strongly acid to extremely acid and low in organic matter. The capacity for supplying available moisture for plants is moderately low.

These soils are suited to most of the crops commonly grown in the county. They are easily worked and respond moderately well to management. Their limited capacity to supply available moisture, however, reduces their productivity. The erosion hazard is moderately high. Soil losses should be kept low because the soil material suitable for roots is shallow.

The soils of this capability unit are:

Catlett gravelly silt loam, undulating phase.
Penn loam, eroded undulating phase.
Penn fine sandy loam, eroded undulating phase.
Penn silt loam, eroded undulating phase.

Capability Unit IIIw-1

This capability unit consists of nearly level to undulating, moderately well drained to somewhat poorly drained soils. These soils are also moderately slowly permeable and low in fertility. The root zone in most of these soils is limited to a depth of about 20 inches. The soils are in the Piedmont Upland and higher parts of the Coastal Plain.

The 6- or 7-inch surface layer is brownish loam or silt loam; the subsoil, to a depth of 16 to 20 inches, is yellowish-brown to yellowish-red, friable to firm silty clay loam to sandy clay loam. Below this depth, in all but the Raritan soil, there is compact, slowly permeable material.

All soils in the unit are strongly acid and low in organic matter. They are moderately high in capacity to supply available moisture for plants. However, in excessively dry weather, the compact layer in the lower subsoil of most soils limits the availability of moisture.

These soils are easily worked and well suited to cultivation. The wettest areas are suited to only a few crops

but can be drained. In these areas field operations are generally delayed in wet weather. Erosion is a slight hazard on most slopes. These soils generally respond to management and heavy fertilization. The compact layer in the lower subsoil of most of the soils limits the depth of the root zone. As a result, these soils are not well suited to some deep-rooted crops.

The soils of this capability unit are:

Beltsville loam, undulating phase.
Beltsville silt loam, undulating phase.
Calverton silt loam, undulating phase.
Calverton silt loam, nearly level phase.
Calverton loam, undulating phase.
Colfax loam, undulating phase.
Raritan silt loam.
Readington silt loam, undulating phase.

Capability Unit IIIw-2

This capability unit consists of nearly level to level, deep, moderately well drained to somewhat poorly drained, permeable, fertile soils on first bottoms. The soils are moderately susceptible to overflow.

The 10- to 20-inch surface layer of these soils is dark-brown silt loam. This is underlain by mottled, friable silty clay loam. The reaction ranges from strongly acid to neutral. Organic matter is moderately high in supply. The capacity for supplying available moisture is high.

Wetness and overflow limit the uses of these soils. The soils can be cropped intensively and are very productive for permanent pasture and moisture-tolerant crops. They respond to drainage. Most areas have good tilth, but wet weather commonly delays fieldwork. A high level of fertility is easier to maintain in these soils than in most of the upland soils.

The soils of this capability unit are:

Chewacla silt loam.
Lindside silt loam.
Rowland silt loam.

Capability Unit IIIw-3

This capability unit consists of nearly level to level, poorly drained and somewhat poorly drained, moderately slowly permeable, low-fertility soils of the Coastal Plain.

The 6- to 12-inch surface layer in these soils is gray silt loam. Below this is mottled, plastic clay. The soils are strongly acid and low in organic matter. They have a high water table.

Wetness and the plastic, clayey subsoil severely limit the use of these soils. Surface drainage improves them greatly, but the plastic, slowly permeable subsoil reduces the feasibility of tile drainage. If these soils are adequately drained by surface methods and properly managed, they are fairly productive of corn and soybeans and of some grasses and legumes used as pasture. Workability is fair in the drained areas, but wetness commonly delays fieldwork.

The soils in this capability unit are:

Elkton silt loam.
Lenoir silt loam.

Capability Unit IIIs-1

This capability unit consists of a nearly level, deep, excessively drained, very rapidly permeable soil of low fertility that is on the lower Coastal Plain. This soil is brownish, loose loamy fine sand to a depth of more than 50 inches from the surface. It is strongly acid, is very low in organic matter, and has a very low capacity for supplying available moisture for plants.

Droughtiness severely limits the capabilities of this soil. Plant nutrients are low in supply and easily leached; consequently, they must be added frequently in large quantity during the growing season. The soil is very easy to work. If management is good, irrigation will improve the yields of many crops, especially of some truck crops.

Galestown loamy fine sand is the only soil in this capability unit.

Capability Unit IVe-1

This capability unit consists of rolling, moderately deep to deep, well-drained, permeable, low-fertility soils of the Piedmont Upland. The 5- to 8-inch plow layer in the less eroded soils is medium textured; that in the severely eroded soils ranges from heavy silt loam in the less eroded parts to silty clay loam in the more severely eroded parts. Under the plow layer is reddish-yellow, friable silty clay loam that continues to a depth of 30 inches or more from the surface.

These soils are medium to strongly acid and low in organic matter. The capacity for supplying moisture for growing plants is medium. Tilth of the more eroded parts is unfavorable. In these parts runoff develops quickly during rains and erosion is a severe hazard when the soil is in cultivation. All soils in this unit should be kept in sod crops most of the time. When cultivated, they should be kept highly fertile so as to maintain an effective plant cover.

The soils in this capability unit are:

Appling gritty loam, eroded hilly phase.
Elioak silt loam, eroded hilly phase.
Elioak silt loam, severely eroded rolling phase.
Glenelg silt loam, eroded hilly phase.
Glenelg silt loam, severely eroded rolling phase.

Capability Unit IVe-2

This unit consists of rolling, shallow, excessively drained, moderately slowly permeable, low-fertility soils of the Piedmont and the high stream terraces. Rolling land, loamy and gravelly sediments, and Masada gravelly loam, eroded rolling phase, are underlain by gravelly sandy material. All the other soils in this unit have disintegrated rock at a depth of less than 20 inches from the surface. All soils are strongly or very strongly acid and low in organic matter. Their capacity for supplying available water is low. Erosion is a serious hazard.

These soils are not easy to work, and they are not well suited to cultivation. However, under careful management, they can be used for crops grown in long cropping systems. The low water-supplying capacity limits their ability to respond to management. The loss of the shallow soil through erosion seriously damages these soils for future use.

The soils in this capability unit are:

Catlett gravelly silt loam, eroded rolling phase.
Louisburg coarse sandy loam, rolling phase.
Manor silt loam, rolling phase.
Masada gravelly loam, eroded rolling phase.
Penn loam, eroded rolling phase.

Penn fine sandy loam, eroded rolling phase.
Penn silt loam, eroded rolling phase.
Penn shaly silt loam, eroded rolling phase.
Rolling land, loamy and gravelly sediments.

Capability Unit IVe–3

This capability unit consists of undulating to rolling, moderately deep, moderately well drained to somewhat poorly drained, moderately fertile soils that have plastic clay in the subsoil. These soils are in the Piedmont Upland and Piedmont Lowland.

The 6- to 8-inch surface layer is chiefly light-brown silt loam; the subsoil in most places is yellowish-brown to mottled, plastic clay. Disintegrated bedrock is 30 to 40 inches from the surface. These soils are slightly acid to strongly acid, and they are low in organic matter. They have a medium to high capacity for supplying available moisture for plants. Tilth is good in the less eroded areas, but it is poor where the plowed layer is in subsoil clay.

These soils can be cultivated, but slow permeability, impaired drainage, erodibility, and unfavorable tilth limit their suitability for row crops. For the rolling phases, these factors also limit the frequency that row crops can be grown. The soils are fairly productive under good management but are less responsive to management than the more permeable, well-drained soils. Fieldwork on these soils is delayed more by wetness than on the more permeable, well-drained soils.

The soils of this capability unit are:

Bremo-Orange silt loams, rolling phases.
Iredell-Mecklenburg silt loams, eroded undulating phases.
Iredell-Mecklenburg silt loams, eroded rolling phases.
Orange silt loam, undulating phase.

Capability Unit IVw–1

This capability unit consists of undulating, moderately deep, moderately well drained to somewhat poorly drained, moderately fertile soils that have plastic clay in the subsoil. They are soils of the Piedmont Upland.

The 7-inch surface layer in these soils is yellowish-brown silt loam, low in organic matter. Under this is yellowish-brown, plastic clay. Partly disintegrated rock is about 30 inches from the surface. The subsoil is medium acid to mildly alkaline. The soils are moderately high in capacity to supply available moisture to plants.

Both soils in this unit are suited to cultivation, but their use is limited by impaired drainage, a shallow root zone, and poor tilth where the plowed layer is in subsoil clay. Erosion is a moderate hazard on the more sloping parts of cultivated areas. Fescue and whiteclover are among the legumes and grasses best suited to the soils. Wetness delays fieldwork more on these soils than on the better drained, more permeable soils.

The soils of the capability unit are:

Iredell silt loam.
Kelly silt loam, undulating phase.

Capability Unit IVw–2

This capability unit consists of nearly level, deep, poorly drained, fertile, permeable soils on bottoms subject to flooding.

The 10-inch surface layer of these soils is brownish silt loam. Under this, and continuing to a depth of 30 inches or more from the surface, is mottled, friable silt loam. These soils are medium to strongly acid and moderately high in organic matter. They have a high capacity for supplying available moisture to plants.

In their natural condition, these soils can be made fairly productive for pasture, although excess ground water and overflow limit their suitability for this use. The soils in the unit respond to surface drainage. If drained adequately, the soils are moderately productive of corn, some kinds of hay, and pasture. Good tilth is fairly easily maintained in the drained areas; wetness can be expected to delay field operations.

The soils in this capability unit are:

Bowmansville silt loam.
Croton silt loam.
Wehadkee silt loam.

Capability Unit Vw–1

This capability unit consists of nearly level to undulating, deep, poorly drained, slowly permeable, moderate- to low-fertility soils in depressions.

Except for Mixed alluvial land, the 9-inch surface layer of these soils is light-brown silt loam, underlain by mottled, plastic clay. At a depth of about 32 inches from the surface, the material begins to be coarser textured and more friable. The Mixed alluvial land has a coarser texture and a more permeable profile, but, like the other soils, it is too wet for cultivation. All soils in the unit are neutral to strongly acid and from low to moderately high in organic matter. They have a moderately high capacity for supplying moisture.

Topographic position, poor drainage, and predominantly tight subsoil limit the use suitability of these soils. The soils are generally best suited to pasture. They are capable of supporting a good cover of forage plants when surface drainage is adequate and proper seeding, fertilizing, and liming are practiced.

The soils of this capability unit are:

Elbert silt loam.
Mixed alluvial land.
Worsham silt loam.

Capability Unit VIe–1

This unit consists of hilly, moderately deep, well-drained, permeable, medium- to low-fertility soils of the Piedmont Upland. Most of the surface soil has been lost through erosion. The subsoil is strong-brown to yellowish-red, friable silty clay loam. The soils are strongly to very strongly acid and medium to low in organic matter. The effective root zone is less than 30 inches in depth, and the capacity to supply available moisture is medium.

The high hazard of erosion and the difficulty of doing fieldwork on slopes make these soils poorly suited to cultivation. The soils are productive for pasture if proper seeding, fertilizing, weed control, and regulated grazing are practiced. If land is needed for cultivation, the less sloping areas should be used. Even here row crops cannot be grown frequently, and special care must be taken to control erosion.

The only soil in this capability unit is:

Glenelg silt loam, severely eroded hilly phase.

Capability Unit VIe–2

This capability unit consists of hilly, shallow, excessively drained, low-fertility soils of the Piedmont and higher Coastal Plain. The 10- to 20-inch surface layer in these soils is brownish sandy loam to silt loam. Except in Lunt fine sandy loam, eroded hilly phase, and Hilly land, loamy and gravelly sediments, the surface layer is underlain by partly disintegrated rock. All of these soils are strongly acid and low in organic matter. Their capacity for supplying available moisture is very low, and the erosion hazard is very great.

Strong slopes, shallow root zones, and limited capacities for supplying moisture make these soils very poorly suited to cultivation. They can be improved and used for pasture, but droughtiness makes it difficult to maintain a good vegetative cover.

The soils of this capability unit are:

Catlett gravelly silt loam, eroded hilly phase.
Hilly land, loamy and gravelly sediments.
Louisburg coarse sandy loam, hilly phase.
Lunt fine sandy loam, eroded hilly phase.
Manor silt loam, hilly phase.
Manor silt loam, eroded hilly phase.
Penn loam, eroded hilly phase.
Penn fine sandy loam, eroded hilly phase.
Penn silt loam, eroded hilly phase.
Penn shaly silt loam, eroded hilly phase.

Capability Unit VIs–1

This unit consists of undulating to rolling, stony, shallow to very shallow, moderately fertile soils of the Piedmont Upland. The 5- to 7-inch surface layer of these soils is stony silt loam. Below this is plastic clay. Bedrock is not far from the surface, and there are some rock outcrops.

These soils are slightly acid to strongly acid and low in organic matter. They have a medium to low capacity for supplying moisture plants can use. Stoniness and shallowness to plastic clay and to bedrock make the soils unsuitable for cultivation. The soils can be improved and used for pasture by proper seeding, fertilization, and weed control. Their grazing capacity is limited because the soils are droughty and forage is short in the drier parts of the growing season.

In this capability unit are:

Iredell-Mecklenburg stony silt loams, eroded undulating phases.
Iredell-Mecklenburg stony silt loams, eroded rolling phases.
Rocky land, rolling basic rock phase.

Capability Unit VIIe–1

This unit consists of steep, shallow, low-fertility soils. These soils are strongly acid, are low in organic matter, and have a low capacity for supplying available moisture that plants can use. Some native vegetation is available for grazing. However, the soils are so poor in responding to management that it is not practical to try to increase productivity. Farm equipment is difficult to manipulate on these soils. Many areas should be wooded.

The soils in this capability unit are:

Louisburg coarse sandy loam, steep phase.
Manor silt loam, steep phase.
Penn shaly silt loam, eroded steep phase.
Steep land, loamy and gravelly sediments.

Table 5.—*Estimated productivity ratings of soils for crops and*

[Ratings in columns A are for ordinary management; those in columns B for improved management.

Soils	Corn (100=50 bushels per acre)		Wheat (100=25 bushels per acre)		Barley (100=40 bushels per acre)		Oats (100=50 bushels per acre)	
	A	B	A	B	A	B	A	B
Appling gritty loam, eroded undulating phase	80	110	80	115	75	100	70	95
Appling gritty loam, eroded rolling phase	70	100	75	105	70	90	60	85
Appling gritty loam, eroded hilly phase	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Beltsville silt loam, undulating phase	75	110	60	90	60	85	55	80
Beltsville loam, undulating phase	70	105	65	95	60	85	55	80
Bermudian silt loam	140	160	[2]	[2]	[2]	[2]	[2]	[2]
Birdsboro silt loam, eroded undulating phase	90	130	80	110	80	110	81	105
Bowmansville silt loam	-----	-----	-----	-----	-----	-----	-----	-----
Brecknock silt loam, eroded undulating phase	90	130	90	110	70	110	60	95
Brecknock silt loam, eroded rolling phase	75	105	70	105	70	100	70	95
Brecknock loam, undulating phase	95	135	95	115	85	115	65	100
Brecknock loam, eroded rolling phase	75	105	75	110	70	100	70	95
Bremo-Orange silt loams, rolling phases	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Bucks silt loam, eroded undulating phase	105	145	95	120	80	120	70	105
Bucks loam, undulating phase	100	140	90	115	75	115	65	100
Calverton silt loam, undulating phase	70	105	65	95	65	95	60	90
Calverton silt loam, nearly level phase	65	100	60	90	60	90	55	85
Calverton loam, undulating phase	70	105	65	95	65	95	60	90
Catlett gravelly silt loam, undulating phase	70	100	70	95	55	80	55	80
Catlett gravelly silt loam, eroded rolling phase	-----	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Catlett gravelly silt loam, eroded hilly phase	-----	-----	[2]	-----	-----	[2]	-----	[2]
Chewacla silt loam	115	160	-----	-----	-----	-----	-----	-----
Colfax loam, undulating phase	55	80	[2]	[2]	[2]	[2]	[2]	[2]
Croton silt loam	-----	-----	-----	-----	-----	-----	-----	-----
Elbert silt loam	-----	-----	-----	-----	-----	-----	-----	-----
Elioak silt loam, eroded undulating phase	110	140	90	115	85	105	75	105
Elioak silt loam, eroded rolling phase	70	100	75	110	70	100	70	100

See footnotes at end of table.

Capability Unit VIIw-1

This unit consists of level, permanently wet areas. Drainage is not feasible because suitable outlets are not available. Use is limited to the growing of natural vegetation and protection of wildlife. Swamp produces hardwood trees of some value, but the timber is difficult to harvest.

Mapping units in this capability unit are:

Marsh.
Swamp.

Capability Unit VIIs-1

This unit consists of rocky land types. Fifteen to ninety percent of the surface is in rock outcrops or covered by rock fragments. The soil material is shallow to bedrock. Slopes range from 2 to more than 25 percent. These rocky land types cannot be cultivated, and they are not capable of responding much to management if they are used for improved pasture. They provide some vegetation for grazing and support some forest. Trees grow slowly.

The soils of this capability unit are:

Rocky land, hilly acidic rock phase.
Rocky land, steep acidic rock phase.
Very rocky land, hilly acidic rock phase.
Very rocky land, rolling basic rock phase.

Productivity Ratings of the Soils

Productivity ratings for the soils in Fairfax County are given in table 5. The productivity rating for each crop grown on a soil is the percentage of the standard yield given at the top of the column for the stated crop. The standard yield is the approximate average yield obtained (without the use of fertilizer or other amendments) on the more productive soils in the United States where the crop is most extensively grown. A productivity rating of 50 for a Fairfax County soil means that the soil is about half as productive of a specified crop as the soil with the standard yield. Soils that have been limed or fertilized or that are unusually productive may have a productivity rating of more than 100 for some crops.

The productivity rating is calculated as follows:

$$\text{Productivity rating} = \frac{\text{Expected yield per acre}}{\text{Standard yield per acre}} \times 100.$$

These ratings cannot be interpreted directly into land values, because distance to market and many other factors must be considered. The ratings can be used for comparing yields of specific crops on different soils within the county and for comparing soils of Fairfax County with those in other parts of the United States for which similar ratings have been made.

Most of the data in table 5 were collected by soil scientists in the field at the time of the soil survey. Some ratings are based on data obtained from experiment stations and from farm records. Where sufficient data are not available, yields were obtained by comparison with soils on which data are available, by field observations, and by consultations with farmers, county agricultural agents, and agricultural specialists.

pasture and quality ratings for vegetables and ornamental shrubs

-Absence of data indicates stated crop is not commonly grown or soil is not suited to it]

Alfalfa (100=4 tons per acre)		Ladino clover (100=2 tons per acre)		Lespedeza (100=1½ tons per acre)		Mixed hay (100=2 tons per acre)		Permanent pasture (100=210 cow-acre days) [1]		Soil quality rating for—	
A	B	A	B	A	B	A	B	A	B	Vegetables	Ornamental shrubs
70	95	70	100	80	110	80	110	70	100	Good	Good.
60	85	60	90	70	100	75	105	65	95	Fair	Fair.
(2)	(2)	(2)	(2)	50	80	65	85	65	90	Very poor	Poor.
(2)	(2)	65	90	60	95	65	100	55	80	Fair	Poor.
(2)	(2)	60	85	65	100	65	100	55	90	Fair	Poor.
(2)	(2)	85	100	95	115	85	105	105	130	Good	Very good.
75	100	80	110	80	110	80	120	80	115	Good	Good.
-------	-------	-------	-------	-------	-------	-------	-------	55	90	Very poor	Very poor.
60	85	70	100	75	105	75	105	65	105	Fair to good	Fair.
60	85	70	100	80	100	75	105	75	105	Fair	Fair.
65	90	75	105	80	110	80	110	70	110	Good	Good.
60	85	70	100	80	100	75	105	75	105	Fair	Fair.
-------	-------	45	70	50	75	55	80	60	90	Very poor	Very poor.
70	100	80	110	80	110	85	115	75	115	Good	Good.
65	95	75	105	80	110	80	110	70	110	Good	Good.
(2)	(2)	75	105	75	110	75	105	75	105	Fair	Poor.
(2)	(2)	75	105	70	105	70	100	70	100	Poor	Poor.
(2)	(2)	70	100	75	110	70	100	70	100	Fair	Poor.
(2)	65	50	80	65	95	70	100	60	90	Fair	Fair.
-------	(2)	(2)	(2)	45	65	50	70	45	65	Poor	Poor.
-------	-------	(2)	(2)	(2)	(2)	-------	(2)	(2)	(2)	Very poor	Very poor.
-------	-------	80	115	75	100	80	100	95	120	Fair	Fair.
-------	-------	60	90	65	95	60	95	60	90	Poor	Poor.
-------	-------	-------	(2)	-------	(2)	-------	(2)	50	85	Very poor	Very poor.
-------	-------	-------	-------	-------	-------	-------	-------	50	90	Very poor	Very poor.
75	105	75	105	75	100	80	115	75	115	Fair to good	Fair to good.
70	95	70	100	75	110	75	110	75	110	Fair	Fair.

TABLE 5.—*Estimated productivity ratings of soils for crops and*

[Ratings in columns A are for ordinary management; those in columns B for improved management.

Soils	Corn (100=50 bushels per acre)		Wheat (100=25 bushels per acre)		Barley (100=40 bushels per acre)		Oats (100=50 bushels per acre)	
	A	B	A	B	A	B	A	B
Elioak silt loam, severely eroded rolling phase	65	95	65	100	65	95	60	90
Elioak silt loam, eroded hilly phase	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Elkton silt loam	-----	-----	-----	-----	-----	-----	-----	-----
Enon silt loam, eroded undulating phase	80	110	80	110	70	100	70	95
Enon silt loam, eroded rolling phase	75	105	75	105	75	100	65	90
Fairfax silt loam, undulating phase	75	105	80	105	70	100	75	100
Fairfax silt loam, eroded rolling phase	65	95	70	100	65	85	60	85
Fairfax loam, undulating phase	75	105	80	110	70	100	75	100
Galestown loamy fine sand	[2]	[2]	[2]	65	60	75	55	60
Glenelg silt loam, undulating phase	115	150	95	120	80	115	75	110
Glenelg silt loam, eroded rolling phase	70	100	75	110	70	100	70	100
Glenelg silt loam, severely eroded rolling phase	65	95	65	100	65	95	60	90
Glenelg silt loam, eroded hilly phase	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Glenelg silt loam, severely eroded hilly phase	-----	[2]	-----	[2]	-----	[2]	-----	[2]
Glenville silt loam	70	105	[2]	[2]	[2]	[2]	[2]	[2]
Hilly land, loamy and gravelly sediment	-----	-----	-----	-----	-----	-----	-----	-----
Huntington silt loam	160	180	[2]	[2]	[2]	[2]	[2]	[2]
Iredell silt loam	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Iredell-Mecklenburg silt loams, eroded undulating phases	65	105	55	80	60	85	55	80
Iredell-Mecklenburg silt loams, eroded rolling phases	60	100	55	80	60	80	55	80
Iredell-Mecklenburg stony silt loams, eroded undulating phases	-----	-----	-----	-----	-----	-----	-----	-----
Iredell-Mecklenburg stony silt loams, eroded rolling phases	-----	-----	-----	-----	-----	-----	-----	-----
Kelly silt loam, undulating phase	60	100	60	90	60	90	55	85
Lenoir silt loam	50	90	[2]	[2]	[2]	[2]	[2]	[2]
Lindside silt loam	120	170	-----	-----	-----	-----	-----	-----
Lloyd loam, eroded undulating phase	90	120	80	110	75	105	75	100
Louisburg coarse sandy loam, rolling phase	60	90	65	100	65	90	60	90
Louisburg coarse sandy loam, hilly phase	-----	-----	-----	-----	-----	-----	-----	-----
Louisburg coarse sandy loam, steep phase	-----	-----	-----	-----	-----	-----	-----	-----
Lunt fine sandy loam, undulating phase	80	125	80	105	80	110	75	100
Lunt fine sandy loam, eroded rolling phase	60	95	60	95	60	85	55	85
Lunt fine sandy loam, eroded hilly phase	-----	-----	-----	-----	-----	-----	-----	-----
Manassas silt loam	120	155	70	100	60	85	60	85
Manor silt loam, rolling phase	65	95	70	105	65	95	65	95
Manor silt loam, hilly phase	-----	-----	-----	-----	-----	-----	-----	-----
Manor silt loam, eroded hilly phase	-----	-----	-----	-----	-----	-----	-----	-----
Manor silt loam, steep phase	-----	-----	-----	-----	-----	-----	-----	-----
Marsh	-----	-----	-----	-----	-----	-----	-----	-----
Masada gravelly loam, eroded rolling phase	50	75	65	90	60	90	50	75
Matapeake silt loam, nearly level phase	130	175	75	105	95	100	85	115
Matapeake silt loam, undulating phase	110	160	75	105	90	100	80	100
Mattapex silt loam, nearly level phase	85	130	60	95	70	100	70	95
Mattapex silt loam, undulating phase	95	135	65	100	75	105	75	100
Mayodan silt loam, undulating phase	75	105	70	105	70	100	70	100
Meadowville silt loam	150	180	70	100	65	90	65	90
Mixed alluvial land	-----	[2]	-----	-----	-----	-----	-----	-----
Montalto silt loam, eroded rolling phase	75	105	75	100	75	105	70	95
Orange silt loam, undulating phase	55	90	50	80	55	75	50	75
Penn loam, eroded undulating phase	70	100	85	115	65	100	70	100
Penn loam, eroded rolling phase	55	75	65	85	65	85	55	75
Penn loam, eroded hilly phase	-----	-----	-----	[2]	-----	[2]	-----	-----
Penn fine sandy loam, eroded undulating phase	70	100	70	95	55	80	55	80
Penn fine sandy loam, eroded rolling phase	50	70	60	80	60	80	50	70
Penn fine sandy loam, eroded hilly phase	-----	-----	-----	-----	-----	-----	-----	-----
Penn silt loam, eroded undulating phase	75	110	80	110	65	105	60	95
Penn silt loam, eroded rolling phase	60	80	70	90	70	90	60	80
Penn silt loam, eroded hilly phase	-----	-----	-----	-----	-----	-----	-----	-----
Penn shaly silt loam, eroded rolling phase	-----	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Penn shaly silt loam, eroded hilly phase	-----	-----	-----	[2]	-----	[2]	-----	[2]
Penn shaly silt loam, eroded steep phase	-----	-----	-----	-----	-----	-----	-----	-----
Raritan silt loam	65	100	[2]	[2]	[2]	[2]	[2]	[2]
Readington silt loam, undulating phase	80	105	60	100	60	100	60	100
Rocky land, rolling basic rock phase	-----	-----	-----	-----	-----	-----	-----	-----
Rocky land, hilly acidic rock phase	-----	[4]	-----	[4]	-----	-----	-----	-----
Rocky land, steep acidic rock phase	-----	-----	-----	-----	-----	-----	-----	-----
Rolling land, loamy and gravelly sediments	-----	[2]	[2]	[2]	[2]	[2]	[2]	[2]

See footnotes at end of table.

pasture and quality ratings for vegetables and ornamental shrubs—Continued

Absence of data indicates stated crop is not commonly grown or soil is not suited to it]

Alfalfa (100=4 tons per acre)		Ladino clover (100=2 tons per acre)		Lespedeza (100=1½ tons per acre)		Mixed hay (100=2 tons per acre)		Permanent pasture (100=210 cow-acre days) [1]		Soil quality rating for—	
A	B	A	B	A	B	A	B	A	B	Vegetables	Ornamental shrubs
60	90	60	95	60	100	70	105	65	100	Poor	Fair.
(2)	(2)	(2)	(2)	60	85	70	90	75	110	Poor	Fair.
-------	-------	-------	-------	-------	-------	-------	-------	40	80	Very poor	Very poor.
65	90	70	100	70	100	75	105	70	105	Fair	Fair.
55	75	70	95	80	100	75	95	75	105	Fair	Fair to poor.
60	85	70	100	75	110	75	105	75	110	Fair	Fair.
50	75	65	85	65	95	70	100	65	95	Fair	Fair.
60	85	70	100	75	110	75	105	70	105	Fair to good	Fair.
(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	Good	Good.
80	105	80	110	80	110	85	115	80	120	Good	Very good.
65	95	75	105	75	110	75	110	75	110	Good to fair	Good to fair.
60	90	60	95	60	100	70	105	65	100	Poor	Fair.
(2)	(2)	(2)	(2)	60	85	70	90	75	110	Poor	Fair.
-------	(2)	(2)	(2)	50	75	60	85	60	100	Very poor	Poor.
(2)	(2)	80	110	75	110	75	100	80	115	Fair to poor	Fair.
-------	-------	-------	-------	-------	-------	-------	-------	-------	(3)	Poor	Poor.
70	90	100	110	115	125	110	120	115	140	Good	Very good.
(2)	(2)	60	80	65	85	60	80	70	90	Very poor	Very poor.
-------	(2)	60	85	65	100	65	90	70	95	Fair to poor	Poor.
-------	(2)	55	80	65	100	60	90	65	90	Fair to poor	Poor.
-------	-------	-------	-------	-------	-------	-------	-------	60	80	Very poor	Very poor.
-------	-------	-------	-------	-------	-------	-------	-------	55	75	Very poor	Very poor.
-------	(2)	65	90	60	95	60	95	65	90	Poor	Poor.
-------	-------	65	95	50	80	60	90	65	95	Very poor	Very poor.
-------	-------	90	120	85	100	90	110	105	130	Fair	Fair.
75	105	75	105	75	105	80	110	75	115	Fair to good	Fair to good.
45	70	65	95	65	100	65	100	60	90	Fair	Fair.
-------	-------	(2)	(2)	45	75	60	80	55	80	Poor	Poor.
-------	-------	-------	-------	-------	-------	-------	-------	-------	(3)	Very poor	Poor.
80	100	70	100	75	110	75	105	65	110	Good	Good.
50	80	60	90	65	100	70	100	60	90	Fair	Fair.
-------	-------	(2)	(2)	40	60	35	60	40	75	Poor	Fair to poor.
60	80	85	105	85	105	90	110	100	120	Good	Good.
50	80	70	100	70	105	70	105	70	100	Fair	Fair.
-------	-------	(2)	(2)	40	70	50	75	50	90	Poor	Fair.
-------	-------	-------	-------	30	65	45	70	40	80	Very poor	Poor.
-------	-------	-------	-------	-------	-------	-------	-------	-------	(3)	Very poor	Poor.
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	Very poor	Very poor.
(2)	-------	50	80	70	95	65	90	55	85	Fair to poor	Fair to poor.
85	115	95	110	90	120	95	110	85	115	Very good	Very good.
75	105	80	100	90	120	90	105	80	135	Good	Good.
50	80	75	105	70	100	70	105	65	100	Fair	Fair.
55	85	70	100	70	100	75	110	60	95	Fair	Fair.
55	80	80	110	85	115	85	115	75	105	Fair	Fair.
65	85	90	110	100	120	95	115	110	140	Very good	Good.
-------	-------	(2)	(2)	(2)	(2)	-------	(2)	70	100	Poor to very poor	Poor to very poor.
60	80	75	100	75	100	80	110	75	105	Fair	Fair.
-------	(2)	50	75	65	100	60	90	60	85	Poor	Poor.
65	85	70	100	80	110	75	110	60	95	Fair	Fair.
25	45	40	60	55	75	50	80	55	90	Fair to poor	Fair to poor.
-------	(2)	(2)	(2)	45	65	40	65	45	80	Fair to poor	Fair to poor.
(2)	65	55	85	70	100	70	100	65	95	Fair	Fair.
(2)	(2)	35	55	50	70	45	70	50	85	Fair to poor	Fair to poor.
-------	-------	(2)	(2)	40	60	35	60	40	75	Poor	Fair to poor.
65	85	75	105	75	105	75	110	65	100	Fair	Fair.
30	50	45	70	60	80	55	85	60	95	Poor	Poor.
-------	-------	(2)	(2)	(2)	(2)	(2)	(2)	50	85	Poor	Poor.
-------	(2)	(2)	(2)	50	70	55	75	50	70	Poor	Poor.
-------	-------	-------	-------	(2)	(2)	(2)	(2)	(3)	(3)	Very poor	Very poor.
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	Very poor	Very poor.
(2)	(2)	75	105	70	105	70	100	75	110	Fair to poor	Poor.
(2)	(2)	80	110	70	100	75	105	80	115	Fair	Fair.
-------	-------	-------	-------	-------	-------	-------	-------	55	90	Very poor	Very poor.
-------	-------	-------	(4)	-------	(4)	-------	(4)	50	80	Poor to very poor	Poor to very poor.
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	Very poor	Very poor.
-------	(2)	(2)	(2)	45	60	50	65	45	65	Poor	Poor.

TABLE 5.—*Estimated productivety ratings of soils for crops and*

[Ratings in columns A are for ordinary management; those in columns B for improved management.

Soils	Corn (100=50 bushels per acre)		Wheat (100=25 bushels per acre)		Barley (100=40 bushels per acre)		Oats (100=50 bushels per acre)	
	A	B	A	B	A	B	A	B
Rowland silt loam	110	155						
Sassafras fine sandy loam, nearly level phase	125	170	80	110	95	100	80	110
Sassafras fine sandy loam, undulating phase	110	160	75	100	90	100	75	105
Sassafras fine sandy loam, eroded rolling phase	50	85	60	95	60	85	55	85
Steep land, loamy and gravelly sediments								
Swamp								
Very rocky land, hilly acidic rock phase								
Very rocky land, rolling basic rock phase								
Wehadkee silt loam								
Wickham and Hiwassee loams, undulating phases	120	160	75	100	100	130	85	120
Woodstown fine sandy loam, nearly level phase	90	135	70	100	70	100	75	100
Woodstown fine sandy loam, undulating phase	90	135	70	105	70	100	75	100
Worsham silt loam								

[1] Cow-acre-days is the number of days 1 acre of pasture will provide grazing for 1 steer, 1 horse, or 7 sheep or goats, without supplemental feed, and without injury to the pasture.

[2] The crop is not commonly grown, but the soil is considered

The figures in columns A show the percentage of the standard yield that can be expected under prevailing management. Such management includes the rotation of crops and the use of low to moderate quantities of commercial fertilizers for corn, small grains, and vegetables. Each year corn and small grains generally get 200 to 300 pounds per acre of 2–12–12, or the equivalent. Common rotations on the uplands, colluvial lands, and terraces last 3 to 5 years, and on the bottom lands, 2 years. Small amounts of manure are spread, mainly on eroded areas. Lime is applied to legumes. Some hay crops are topdressed with phosphate or a complete fertilizer, and some corn is sidedressed with nitrogen fertilizer. Alfalfa gets lime. Permanent pastures are topdressed with fertilizer, but manure is applied to small spots every few years. A few permanent pastures are clipped, and some are occasionally burned. A few are limed and topdressed with phosphate. Common management practices are not the same on all soils. Some of the common uses and management on different soils are given in the section "Descriptions of the Soils."

The figures in columns B show the percentage of the standard yield that may be expected under improved management. Improved management includes the proper choice and rotation of crops; the correct use of commercial fertilizer, lime, and manure; use of proper tillage methods; return of organic matter to the soil; applying the best practical methods of controlling weeds and pests; and employing engineering measures to control water on the land. All these practices are applied, where necessary, to maintain or increase soil productivity within practical limits.

The yields in columns B, when compared with those shown in columns A, give some idea of the response crops can be expected to make to good soil management. They may be considered as production goals that can be reached by feasible management practices.

Although knowledge about good management for specific soils used for certain crops is somewhat limited, some deficiencies in the soils are known and others are considered probable. On this basis, productivity at the B level of management is estimated.

The estimates in table 5 are to be interpreted for some soils with the following facts in mind.

Periodic floods reduce the average yields of crops from the Bowmansville, Chewacla, Croton, Elbert, Huntington, Manassas, Meadowville, Rowland, Wehadkee, and Worsham silt loams and from Mixed alluvial land. Yields of small grains from the Bermudian, Manassas, and Meadowville silt loams are reduced in wet seasons because of lodging.

Yields of crops from the undulating phases of Beltsville loam and Beltsville silt loam; the undulating and nearly level phases of Calverton loam and Calverton silt loam; and the undulating phase of Colfax loam are reduced mainly because of fragipans in the subsoil.

The stated ratings are based on undrained areas of the Bowmansville, Croton, Elbert, Elkton, Wehadkee, and Worsham silt loams and from Mixed alluvial land.

More kinds of crops could be grown on the Bowmansville, Chewacla, Croton, Elkton, Lindside, Rowland, Wehadkee, and Worsham silt loams and on Mixed alluvial land if these soils were drained by suitable methods.

Soil Associations

Individual soils occur in a characteristic position on the landscape, and different soils occur in characteristic patterns. For example, the Glenelg soils on ridges in the Piedmont Upland are generally associated with the redder Elioak soils and with the shallower Manor soils. The Wehadkee soils on alluvial deposits of the flood plains are associated with the better drained Chewacla soils and with the Wickham soils of the nearby low terraces.

After studying the soils and the way they are arranged, it is possible to make a general map that shows the main patterns of soils. Such a map is the colored general soil map in the back of this report. The general soil areas

pasture and quality ratings for vegetables and ornamental shrubs—Continued

Absence of data indicates stated crop is not commonly grown or soil is not suited to it]

Alfalfa (100=4 tons per acre)		Ladino clover (100=2 tons per acre)		Lespedeza (100=1½ tons per acre)		Mixed hay (100=2 tons per acre)		Permanent pasture (100=210 cow-acre days) [1]		Soil quality rating for—	
A	B	A	B	A	B	A	B	A	B	Vegetables	Ornamental shrubs
		75	110	70	95	75	95	90	115	Fair	Fair.
80	110	90	105	95	125	95	110	80	110	Excellent	Very good.
80	110	80	100	90	120	90	105	75	130	Very good	Very good.
50	80	60	90	60	90	70	100	55	80	Fair	Fair.
										Very poor	Very poor.
										Very poor	Very poor.
										Very poor	Very poor.
										Very poor	Very poor.
								60	95	Very poor	Very poor.
80	110	95	110	95	120	95	110	85	115	Fair	Good.
55	90	75	105	75	105	75	110	60	95	Very good	Fair.
60	90	70	100	75	105	75	110	55	90	Very good	Fair.
			(2)		(2)		(2)	55	90	Very poor	Very poor.

physically suited to it.

[3] Good yields of pasture or crops require intensive management.

[4] Crops can be grown on small areas of this soil as indicated in the section "Descriptions of the Soils."

are also called soil associations. Each kind of general soil area, or soil association, as a rule, contains a few major soils and several other minor soils in a pattern that is characteristic, although not uniform. The soils within any one association are likely to differ greatly among themselves in some properties, for example, in slope, depth, stoniness, or natural drainage. Thus, the general soil map does not show the kind of soil at any particular place, but a pattern that has in it several kinds of different soils. A given kind of soil may occur in more than one soil association, but as part of a different pattern.

The quality and proportion of the soils in an association generally determine the agricultural uses that prevail. For example, if a dominant soil suited to corn is associated with soils that are poorly suited or unsuited to corn, this may determine how intensively the dominant soil is used for corn and what crops other than corn are grown in the rotation or cropping system.

The general soil map is useful to people who want a general idea of the soils, who want to compare different parts of the county, or who want to know the possible location of good-sized areas suitable for a certain kind of farming or other land use. This section of the report describes 24 general soil areas, or soil associations, in Fairfax County.

Soils on Alluvial Deposits

1. *Rowland-Bermudian-Bowmansville association*

Level to nearly level and somewhat poorly drained, poorly drained, and well-drained soils on flood plains consisting of materials that washed from the Piedmont Lowland.—This association comprises a very small percentage of the county. It occurs mostly along Bull Run and Occoquan Creek in the eastern and central parts of the Piedmont Lowland. The soils have been derived from fine soil materials that washed from higher land in this region. Elevations range from 70 to 250 feet above sea level. The relief is level to nearly level; runoff is slow. The entire area is subject to flooding, and most soils, except the Bermudian, have slow internal drainage.

Most areas are in permanent pasture and are used with soils of other associations. Management needs and water supplies are similar to those of the Orange-Bremo-Elbert association.

2. *Chewacla-Wehadkee association*

Level to nearly level and somewhat poorly drained, poorly drained, and moderately well drained soils on flood plains consisting of material that washed from the Piedmont Upland.—This association occurs on first bottoms throughout the Piedmont Upland. The soils are subject to flooding and have formed from fine soil materials that were washed principally from the Glenelg, Elioak, Manor, Appling, Louisburg, Lloyd, Enon, and associated soils. The association comprises a very small percentage of the county; the principal areas are along Difficult Run and Long Branch. Elevations range from 200 to 400 feet above sea level. Except for a few small areas of Meadowville silt loam, the soils of this association have level to nearly level relief, slow to very slow runoff, and medium to very slow internal drainage. The somewhat poorly drained Chewacla soils are predominant, but areas of the poorly drained Wehadkee soils are common. Included also are a few small areas of the well-drained Congaree soil (not mapped in Fairfax County), the compact, poorly drained Worsham soil, and Mixed alluvial land.

Most areas have been cleared and are used chiefly for permanent pasture. Because of the flood hazard and the size of individual areas, there are few entire farms in the association. Farms that contain some of these soils are mainly of the livestock and dairying types.

Some of the most fertile soils in the county are in this association. The soils are young. In many places they receive deposits of fresh sediment after each flood. In normal seasons, the Congaree and Chewacla soils produce excellent corn and other row crops, but the Wehadkee

soils are suited only to permanent pasture unless they are drained. Some areas need drainage to obtain good pasture. There is no erosion hazard. The flood hazard, however, limits the use of soils in most places. Workability of the Chewacla and Wehadkee soils is poor to very poor, mainly because of the poor drainage. Lime and phosphate are generally needed in a good fertility program, and some potash and nitrogen may be needed to establish good pastures.

Trampling of pasture should be avoided when the soils, especially the Wehadkee, are wet. Water supplies in this association are abundant. The major streams of the county flow through the area, and there are many springs near these bottom lands, along margins of the adjacent upland. Few, if any, wells are ever located on these soils. Because of wetness and the flood hazard, few homes have been built in this area. Many bottom-land areas are used for parks and recreation.

3. Huntington-Lindside association

Level to nearly level and somewhat poorly drained, poorly drained, and well-drained soils on flood plains consisting of material that washed from limestone.—This soil association is on the flood plains of the Potomac River and is subject to frequent flooding. It comprises a very small percentage of the county. The soils were derived from fine alluvial material that washed from areas that are underlain principally by limestone. Runoff is slow and internal drainage is rapid in the Huntington soils; these characteristics are both slow in the Lindside soils.

Most areas have been cleared and are used principally for permanent pasture, mixed hay, and corn. The Huntington soils are suited to corn and to many kinds of hay. The Lindside soils are somewhat poorly drained and are best suited to pasture or to mixed hay, but not to alfalfa. Corn grows well in some areas.

Soils on Crystalline Rock of the Piedmont Upland

4. Glenelg-Elioak-Manor association

Undulating, rolling, hilly, and steep micaceous soils over quartz sericite schist.—This is the most extensive association in the county. It is on the tops and sides of moderately high ridges in the central part of the county. The largest areas of the association are in the north-central part of the county around Forestville and Browns Chapel. The highest elevation in the association is about 400 feet above sea level. Most areas are 150 to 200 feet above the Piedmont Lowland (Triassic). However, near Pender, along Penders Ridge, northeast of Centreville, and southeast of Herndon, the Piedmont Lowland is elevated above this association.

The natural drainage system is well developed and provides medium to very rapid runoff. Internal drainage is rapid except in small areas in drainageways where local alluvium or colluvium has accumulated.

Except for a few small areas of soil over greenstone, the parent material of the soils in this association has weathered from quartz sericite schist. The Glenelg, Elioak, and Manor soils make up most of the association. In addition, there are small areas of the Glenville, Worsham, and Meadowville soils and of Rocky land, hilly and steep acidic rock phases, of Mixed alluvial land, and of the Chewacla soils.

The Glenelg soils make up about 70 percent of the association, and they occur mainly on rolling, undulating, and hilly relief. Except for the hilly slopes, they are well suited to crops. The Elioak soils, next in extent, are mainly on undulating and rolling relief, and they are nearly all suited to crops. The Manor soils occur mainly on hilly and steep relief and are best suited to pasture or forest. Most of the Glenelg and Elioak soils are used for crops and pasture; the Manor soils are about equally divided in use between forest and pasture. Forests consist mainly of cutover hardwoods, which include oak and poplar mixed with scattered areas of Virginia pine.

Corn, small grains, alfalfa, and mixed hay are commonly grown on the Glenelg and Elioak soils. Productivity, conservability, and workability are good on the smoother slopes, but the risk of erosion is high on the steep and shallow Manor soils. Garden vegetables and ornamental shrubs are well suited to the smooth areas, but high levels of fertility are required for good plant growth.

Many large dairy and livestock farms are in this association. However, in the southeastern part, many areas are in forest and in small, subsistence, and part-time farms. Mainly because of their good physical characteristics, most of the soils of this association are well suited as material for homesites, and many areas in the eastern part of the association are now in urban developments.

Ground water is in good supply in this association. Springs are plentiful, and wells furnish good water from fairly shallow depths.

5. Manor-Glenelg-Elioak association

Chiefly shallow and micaceous, rolling, hilly, and steep soils over quartz sericite schist.—This association covers only a small area and is mostly near the large streams in the county. Most areas are along the Potomac River and Difficult Run in the northern part of the county and near Clifton in the southern part of the county.

The Manor soils make up 70 to 80 percent of this association. In addition, there are small areas of the Glenelg, Elioak, Glenville, and Worsham soils and of Mixed alluvial land and of Rocky land, hilly and steep acidic rock phases.

Most of this association is in forest or pasture, uses to which the soils are best suited. The association has no subsistence farms. Many of these soils are too steep for building sites, although other characteristics make them favorable as construction material. Several recreational areas are in this association.

6. Orange-Bremo-Elbert association

Undulating and rolling, fine-textured clay and shallow silt loam soils over greenstone.—This association has an area of about 24 square miles, mainly in the southwestern part of the county. It occurs as a long, narrow area from Oakton to the Prince William County line just west of Clifton. The elevation ranges from 360 to 400 feet above sea level. The drainage pattern is not well developed.

These soils have formed in material that weathered from greenstone and a mixture of greenstone and acidic schist. The Orange soils occupy about 65 percent of the

association. They are moderately well drained and light colored and have a heavy, plastic clay subsoil. They are best suited to permanent pasture, forest, and hay, but not to alfalfa. Internal drainage in the Orange soils is slow to very slow. The Bremo soils are brown and shallow, and they occur mostly on rolling relief. They are best suited to pasture or forest.

The Enon soils are moderately deep to deep and are well drained to moderately well drained. They have formed in material that weathered from mixed acidic and basic rocks. They occur on undulating and rolling relief and are fairly well suited to corn, small grains, and mixed hay. A few areas of the poorly drained Elbert soils and of Mixed alluvial land along small streams are also included in this area.

Most of this association is in forest. A very small area is in pasture and crops, and a few small housing developments are scattered throughout the association. No large farms are in the association.

Most rock formations are hard and resistant to weathering. Supplies of ground water are very limited. Wells are difficult to dig, and they produce very little water. Because of the slow internal soil drainage, ponds hold water well, and they can be kept full because there is ample surface runoff.

The Orange soils are among the poorest materials in the county for housing developments, particularly as sites for house basements, septic-tank drainage fields, lawns, gardens, and shrubbery, and as a source of domestic water.

7. Appling-Louisburg-Colfax association

Light-colored and somewhat poorly drained, well-drained, and excessively drained, coarse-textured soils over granite gneiss.—This association covers about 60 square miles in the south-central part of the county. It has mostly rolling, hilly, and steep relief, and it is dissected by numerous moderately deep to deep drainageways. Elevation above sea level ranges from about 20 feet near Occoquan (in Prince William County) to about 403 feet along Highway 123 north of Reeds Store. Ryan Dam on Occoquan Creek has an elevation of 129 feet above sea level.

The soils have formed in material that weathered from coarse-grained granite gneiss. The Appling soils make up most of the association. They have a grayish-brown, gritty surface layer and a yellowish-red, clay to clay loam subsoil. They are well drained and are mostly on rolling and hilly relief. The Louisburg soils are hilly and steep, excessively drained, and coarse textured. They are shallow and have little or no developed subsoil. The Colfax soils are grayish and somewhat poorly drained and have formed over colluvial material.

Most of the Appling soils are in part-time farms and housing developments. The Louisburg and Colfax soils are mostly in forest. The Work House Prison Farm is partly in this association, and it is the largest farm in the association. The smooth area of the Appling soils is well suited to a wide variety of crops. Most engineering characteristics are favorable. The Louisburg soils are suited to forest or pasture, but the less hilly and rolling slopes of this soil are suitable as material for housing developments and other construction. The somewhat poorly drained Colfax soils are best suited to forest, pasture, or mixed hay, but not to alfalfa. They are poor as material for housing developments and many other types of construction. Springs are plentiful, and fairly shallow wells produce good water.

8. Louisburg-Appling-Worsham association

Mostly shallow, hilly and steep, excessively drained, coarse-textured soils over granite gneiss.—This association is mostly on hilly and steep relief in the southeastern part of the county northwest of Occoquan. It has a well-developed drainage pattern. The Louisburg soils are excessively drained, the Appling are well drained, and the Worsham are poorly drained. These soils have formed in material that weathered from granite gneiss. Most of the association is in cutover hardwood forest; the rest is about equally divided in idle land, in pasture, and in crops.

The Louisburg soils are best suited to forest or pasture. The smoother areas of the Appling soils are suited to general crops, but most Appling soils are hilly and are best suited to pasture or forest. The poorly drained Worsham soils are best suited to pasture or forest. All these soils are strongly acid and low in fertility.

Except for the steep slopes, the Louisburg and Appling soils are fair to good as material for septic-tank drainage fields, roadbeds, and other types of engineering construction. The Worsham soils are very poor construction material. Supplies of water in this association are good. Wells furnish good water; springs and creeks are plentiful.

Soils on Sandstone, Shale, and Conglomerate of the Piedmont Lowland

9. Penn-Calverton-Croton association

Mostly shallow soils over red and reddish-brown shale, sandstone, and shaly sandstone.—This is one of the largest soil associations in the county, and it is the most extensive one in the Piedmont Lowland (Triassic). It is widely scattered in fairly large areas in the western part of the county. The drainage system is fairly well developed.

The topography is mostly undulating and rolling with hilly and steep slopes near the more deeply dissected drainageways (fig. 6). Elevations range from 50 to 450 feet above sea level. The shallow, well-drained to excessively drained Penn soils make up most of the association, but there are also some areas of the more poorly drained Croton and Calverton soils. A few large farms are in the association.

Except for some of the steep Penn soils and the wet, flat Croton soils, most of the soils in the association are used for crops and pasture. Corn, small grains, and mixed hay are commonly grown. The Penn soils are best suited to small grains and grass; the Calverton soils, to mixed hay; and the Croton, to permanent pasture. The soils of this association are low in natural fertility. Lime, organic matter, and a complete fertilizer are needed. Livestock and dairy farming are perhaps the best farming systems for these soils.

Supplies of water in this association are less favorable than in the Glenelg-Elioak-Manor association. Wells furnish most of the water for home and farm use. Those

Figure 6.—The Penn-Calverton-Croton association.

less than 100 feet deep furnish adequate water in many places. Water can also be obtained from a few large creeks in this association. The Penn soils are good for septic tanks and fair to good for roads. The Calverton and Croton soils are poor to very poor for these uses. Most soils are suitable as material for farm ponds.

10. Brecknock-Catlett-Croton association

Grayish, mostly undulating and rolling, moderately deep and shallow soils over baked shale and shaly sandstone.—This association is mainly in the western and southwestern parts of the county. It has mainly undulating and rolling topography, but small areas near larger streams are hilly. The well drained to moderately well drained Brecknock soils make up most of the association, although there are minor amounts of the shallow Catlett, the poorly drained Croton, and the clayey Kelly soils scattered throughout the association. There are also small areas of the somewhat poorly drained and moderately well drained Calverton and Manassas soils. Most of the association, except some areas of the hilly Catlett and the wet Croton soils, is used for crops and pasture.

The Brecknock soils are well suited to most crops grown in the county. A complete fertilizer, lime, and organic matter are needed for high yields. The shallow, droughty Catlett soils are best suited to pasture and small grains. The Croton soils are best suited to permanent pasture, but drainage is needed in places to obtain high yields of forage.

Dairying and the raising of livestock are the most common types of farming. However, there are a few small, part-time farms scattered throughout the association.

Most of the domestic and livestock water is obtained from creeks, wells, and a few springs. Wells are fairly easy to dig, and they supply good quantities of water from depths of 60 to 200 feet. The Brecknock soils are good to fair as material for roadbeds and septic-tank drainage fields. The Catlett soils are good as material for roadbeds but are too shallow for septic-tank drainage fields. The Croton soils are poorly drained. They are poor to very poor as material for roadbeds and septic-tank drainage fields. The smaller areas of the Kelly, Calverton, and Manassas soils are somewhat poorly drained and moderately well drained. These soils are also poor as material for roadbeds and septic-tank drainage fields.

11. Kelly-Brecknock-Catlett association

Gently undulating to rolling, fine-textured, grayish soils over mixed diabase and baked shale and over baked shale and shaly sandstone.—This association consists of a small acreage in the extreme western part of the county. It has a weakly developed drainage system. The elevation ranges from 230 to 400 feet above sea level.

Most of this association has been cleared and is used for crops and pasture. The Kelly soils are the most extensive and are best suited to hay and permanent pasture, but not to alfalfa. They have layers of heavy clay in the subsoil and are difficult to work and to keep

highly productive. The Brecknock soils are well drained to moderately well drained, and they are well suited to most crops grown in the area. The Catlett soils are shallow, droughty, and low in fertility, and they are suited mainly to pasture, forest, small grains, and grasses. Small areas of the Croton, Calverton, and Elbert soils are included with the association. These included soils are best suited to permanent pasture and mixed hay, but not to alfalfa. Lime and a complete fertilizer are needed to improve fertility.

Dairying and the raising of livestock are the most common types of farming. The number of part-time farmers is increasing. Very few farms have all their area completely in this association.

Supplies of water are fair to good. Wells are fairly hard to dig, especially in the mixed shale and diabase material. Few springs are in the area. The Kelly and Catlett soils are poor as material for roadbeds, septic-tank drainage fields, lawns, and shrubs; the Brecknock soils are good to fair as material for these uses.

12. Iredell-Mecklenburg-Rocky land association

Undulating and rolling, fine-textured clay soils and stony land over diabase and syenite.—This association has an area of about 37 square miles, or 11.9 percent of the county. Elevations range from 250 to 400 feet above sea level. Most soils in the association have a heavy clay subsoil, and they have slow to moderately slow internal drainage. The overall drainage system is weakly developed except along streams having sources outside this association. Small areas of the poorly drained Elbert and of the well-drained, red Montalto soils occur throughout the association.

The soils in this association are generally best suited to pasture and hay, but not to alfalfa. They are fairly fertile, but because of the heavy clay subsoil, workability is poor. Several dairy and livestock farms are in this association. Most of the soils are used with those in other associations that are better suited to intensive crop production.

Rock formations under the soils of this association are hard and resistant to weathering. Supplies of ground water are limited. Wells are difficult to dig, and they produce little water. The soils are good as material for the construction of dams. Because of the slow internal drainage, much runoff is available for ponds. The heaviness of the clay subsoil and the shallowness to massive, fine-grained, impervious bedrock make these soils very poor to poor as material for homesites, roadbeds, septic-tank drainage fields, lawns, and shrubs.

13. Calverton-Readington-Croton association

Somewhat poorly drained, poorly drained, and moderately well drained soils over red shale and shaly sandstone.—This association is in the western part of the county and covers an area of about 10 square miles. The terrain is level to very gently undulating. Stream patterns are weakly developed. Elevations range from 50 to 300 feet above sea level. The soils have slow internal drainage and slow runoff.

The Calverton soils are light colored, moderately deep, and moderately well drained to somewhat poorly drained. They are best suited to mixed hay, pasture, and small grains, but not to alfalfa. The Readington soils are shallow and moderately well drained. They are suited to a wide variety of crops and some vegetables, but not to alfalfa. The Croton soils are gray and wet and are best suited to pasture or forest. Nearly all of this association has been cleared and is used for pasture and crops.

Surface drainage, lime, a complete fertilizer, and large amounts of organic matter are needed for good management of these soils.

Dairying, general-purpose farming, and livestock farming are the most common enterprises. Several large farms are in this association.

Wells, farm ponds, a few springs, and a few small streams supply most water used in this association. Wells are most important, and they are fairly easily dug and produce good supplies of water from depths of 60 to 150 feet. Most of these soils have slow to very slow percolation and are poorly suited as material for septic-tank drainage fields and roadbeds.

14. Penn-Bucks-Calverton (Sandy) association

Mostly deep, undulating and nearly level soils over red shaly sandstone and sandstone.—This association consists of a fairly large acreage along the eastern edge of the Piedmont Lowland (Triassic) in the western part of the county. The general drainage system is fairly well developed. Elevations range from 180 feet to about 480 feet above sea level. Drainage in the northern part of this area flows north into the Potomac River; that in the southern part flows into Bull Run. Steep areas are along the lower tributaries of the large streams.

Most soils in the association are well drained to excessively drained. There are, however, small areas of the moderately well drained Calverton, the somewhat poorly drained Manassas, and the poorly drained Croton soils. Most of the association acreage is about equally divided between the Penn and the Bucks soils. More than half the association area has a loam or fine sandy loam surface layer and is underlain by sandstone, shaly sandstone, and sandstone conglomerate. The silt loam soils are underlain principally by siltstone and shale and by very fine grained shaly sandstone. The sandier, or coarser, soils generally are along the eastern edge of the association.

Nearly all of this association is used for crops or pasture. The wooded areas are on the steeper slopes near large streams. The Penn and Bucks soils on smooth slopes have a wide range of suitability and produce fair to good yields of most crops grown in the county. The use of the Penn soils, however, is limited because they are shallow and rolling and hilly. The Calverton soils have a narrow range of suitability because of their natural drainage conditions. They are best suited to plants that can tolerate wetness and are suitable for pasture and mixed hay.

Few springs are in this association. Supplies of water are usually adequate from wells that are generally less than 150 feet in depth. Additional supplies can usually be obtained by digging deeper wells. Most small creeks go dry in dry weather. Except for small areas of the Calverton, Croton, and Manassas soils, the soils in this association are good material for house base-

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ments, septic-tank drainage fields, and subgrades for highways and airports.

15. Calverton-Brecknock-Croton (Loams) association

Mostly nearly level and somewhat poorly drained, poorly drained, and well-drained soils over baked sandstone and shaly sandstone.—This association is near Herndon in the western part of the county. It has a weakly developed stream pattern.

The soils have formed from material that weathered from light-colored and gray, baked and partially baked sandstone and shaly sandstone. Internal drainage and runoff are slow. The Calverton soils are light colored and moderately well drained to somewhat poorly drained. They are best suited to mixed hay, pasture, and small grains, but not to alfalfa. The Brecknock soils are grayish-brown, well drained to moderately well drained, and suited to a wide variety of crops. If used for crops, the soils in this association should be drained and receive lime, large amounts of organic matter, and a complete fertilizer.

The Croton soils are gray, flat, and wet. They are best suited to pasture and forest. Eighty percent of this association has been cleared and is used for crops and pasture; the rest is wooded, is idle, or has been developed for housing.

Livestock farming, general-purpose farming, and dairy farming are most common in this area. Several fairly large farms are in the association.

Supplies of water are obtained from wells, farm ponds, a few springs, and a few small streams. Wells, the most important source, are fairly easily dug and furnish good supplies from depths ranging from 60 to 200 feet.

The Calverton and Croton soils are very poor as material for homesites, septic-tank drainage fields, and roadbeds, but they are excellent for farm ponds. The Brecknock soils are good to fair material for these uses.

16. Mayodan-Calverton-Penn association

Moderately well drained, somewhat poorly drained, and well drained shallow soils over sandstone conglomerate and fluvial material along the edges of the Triassic areas.—This association is along the extreme eastern edge of the Piedmont Lowland (Triassic), mostly on Penders Ridge. Slopes are gently undulating, and the stream pattern is weakly and sparsely developed. Runoff and internal drainage are slow. Differences in elevation are very slight, and most areas are on fairly wide ridgetops.

The Mayodan soils have formed from fluvial material that originated from sandstone conglomerate, sandstone, and shaly sandstone from the Piedmont Lowland. These sediments overlie the Glenelg soil materials in many places. The Calverton soils have developed, for the most part, from the residuum of sandstone and shaly sandstone. However, some areas have formed from old fluvial material similar to that of Mayodan soils. The Penn soils have formed in place from red shale and sandstone.

Seventy-five percent of this association is in cutover hardwood forest; the rest is about equally idle, in urban developments, in pasture, and in crops. No subsistence farms are in this association.

The water supply, drainage, fertility, and the suitability of the soils as material for construction are similar to those described for the Calverton-Brecknock-Croton (Loams) association.

Soils on Mixed Crystalline Rocks and Older Coastal Plain Sediments

17. Fairfax-Beltsville-Glenelg association

Mostly moderately well drained and well drained soils on high Coastal Plain terraces that have formed from fluvial material and from the residuum of quartz sericite schist.—This association occurs as widely scattered areas on undulating and rolling terrain in the south and central parts of the county. The drainage system is poorly developed. Elevations above sea level range between 200 feet near Occoquan and 450 feet near Tysons Corner and Fairfax.

The Fairfax and Beltsville soils make up 80 percent of this association. They have formed from old sediments that overlie the old surface of the Glenelg and Elioak soils. The Glenelg soils have developed from material that weathered from quartz sericite schist. They generally occur on more strongly undulating and rolling topography than either the Fairfax or the Beltsville soils.

Most of this association is in cutover hardwood forest. Housing developments are numerous, especially near Fairfax and Tysons Corner and in the eastern part of the association where trunk sewage systems have been built. Most cleared areas are idle or are used for general crops and pasture.

The moderately well drained to well drained Fairfax soils are the most extensive. They are well suited to corn, small grains, and mixed hay. The Beltsville soils have a fragipan at a depth of about 22 inches, and they are best suited to corn and mixed hay. The Glenelg soils are the most productive soils in this association and are well suited to nearly all crops grown in the county.

Lime and a complete fertilizer are needed to improve productivity, because these soils are strongly acid and low in natural fertility. Part-time farming and housing developments are the most common uses of the cleared areas.

The Fairfax soils are fair as material for septic-tank drainage fields and good for roadbeds. Septic-tank drainage fields are more efficient if they are in the softer micaceous material, which underlies the soils. The Beltsville soils are poor as material for septic-tank drainage fields and roadbeds, but the Glenelg soils are good for these purposes.

Supplies of water in this association are good. Wells are easily dug and furnish good water from relatively shallow depths. Springs are plentiful.

18. Fairfax-Beltsville-Appling association

Mostly well drained to moderately well drained soils on high Coastal Plain terraces that have formed from fluvial material and from the residuum of granite gneiss.—This association is very similar to the Fairfax-Beltsville-Glenelg association except that most of the soils have coarser textured profiles. The Fairfax and Belts-

ville soils have developed in old sediments that overlie the old surface of the Appling and the Cecil soils instead of that of the Glenelg and Elioak soils. Topography, natural drainage, water supply, urban development, and present uses are very similar to those in the Fairfax-Beltsville-Glenelg association.

Soils on Coastal Plain Sediments

19. Lunt-Hilly and Steep land, loamy and gravelly sediments-Beltsville association

Mostly hilly, steep, and rolling and well-drained to excessively drained soils and land types on moderately high Coastal Plain terraces.—This association consists of a small acreage in the southeastern part of the county in the vicinity of Lorton. The main stream patterns are moderately well developed, especially where the Lunt soils and the Hilly and Steep land predominate.

The Lunt soils are brown, well drained, sticky, and moderately heavy to light textured. They are well suited to most crops grown on smoother relief. The Hilly land and Steep land consisting of loamy and gravelly sediments is shallow, gravelly, and excessively drained. It is best suited to forest or pasture. The Beltsville soils are moderately well drained and have a fragipan in the subsoil. They are best suited to mixed hay, pasture, and small grains. The underlying parent material of the soils in this association consists of sand, silt, clay, and gravel, mainly fluvial in origin.

About half of this association has been cleared and is idle or in urban developments, pasture, or crops. The rest is in cutover forest consisting of hardwoods and Virginia pine.

The soils in this association are strongly acid, are low in fertility, and require large amounts of a complete fertilizer and lime for good production of crops. Most farms in the association have part of their land in adjoining associations. Supplies of water are only fair. Wells are the source of most of the water.

The Lunt soils are good as material for urban development and engineering construction, but the Beltsville soils and the Hilly and Steep land are poor to very poor for these uses.

20. Matapeake-Mattapex-Woodstown association

Nearly level to gently sloping, well drained and moderately well drained soils over sand, silt, and clay on low Coastal Plain terraces.—This association is on low marine terraces in the southeastern part of the county, chiefly on Hallowing Point and north of Mount Vernon. The soils have formed from sand, silt, and clay that originated in the lower Coastal Plain. Differences in elevation are small.

The Matapeake soils are deep, brown, well drained, and moderately heavy textured. They are widely suited to most crops grown in the county. The Mattapex and Woodstown soils are deep, medium textured and light textured, and moderately well drained. They are best suited to corn, soybeans, mixed hay, and small grains, but are not suited to alfalfa. Ninety percent of this association is cutover hardwood forest. The rest is in urban developments and recreational areas.

21. Hilly and Steep land, loamy and gravelly sediments-Woodstown-Matapeake association

Mostly hilly and steep land and moderately well drained soils over sand, silt, and clay on the lower Coastal Plain.—This inextensive association occurs along escarpments and steep slopes near streams on the lower Coastal Plain terraces. Loamy and gravelly sediments make up most of the association. These sediments consist of shallow, excessively drained, and multitextured land types, which are best suited to forest or pasture. The well drained Matapeake and the moderately well drained Woodstown soils are well suited to most crops grown in the county. All of this association is in forest, a use to which 90 percent of the association is best suited. Timber grows well and consists mainly of hardwoods. The soils are acid and low in natural fertility. Management consists of improving forest composition and the habitat for wildlife.

22. Galestown-Sassafras-Woodstown association

Mostly moderately well drained, well drained, and excessively drained sandy soils over sand and sandy loam on the lower Coastal Plain.—This association consists of of about 1½ square miles on Hallowing Point in the southeastern part of the county. The topography is nearly level and undulating. Differences in elevation are very small, and the natural drainage pattern is very poorly developed.

The Galestown soils are nearly level, excessively drained loamy sand. They are best suited to vegetables and truck crops, and in most years irrigation is needed for high yields. The Woodstown soils are moderately well drained, light-textured soils. They are suited to most crops grown in the county, except alfalfa. The Sassafras soils are brown, well drained, and light textured. They are well suited to all crops grown in the area.

The soils in this association are acid and low in natural fertility. Therefore, lime and a complete fertilizer are needed to improve productivity. Erosion hazard is very low because the soils are permeable and have gentle slopes.

Wells, a few springs, and a few small streams furnish most of the water used in this association. Wells are the most important source. They furnish fairly good supplies from relatively shallow depths.

All of these soils, except the Woodstown, are well suited as material for urban developments and septic-tank drainage fields. The Woodstown is only moderately well suited, because of a seasonal high water table. Eighty-five percent of this association is cutover hardwood and pine forest; the rest is in urban and recreational developments. Very few field crops are grown, but many areas are in home gardens.

23. Beltsville-Elkton-Sassafras association

Nearly level to level and poorly drained, moderately well drained and well drained soils on the moderately low Coastal Plain terraces.—This association is in the southern and eastern parts of the county. It covers a large area and consists of many soil series. The main drainage pattern is weakly developed, and many of the soils are poorly drained. Most of the association is in

urban developments or military reservations. In addition to the major soils, the association includes a few small scattered areas of the Sassafras, Matapeake, and Lunt soils and gravelly and loamy Coastal Plain sediment. There are no farms of any size in the area. Most soils are poor as material for septic-tank drainage fields and other construction.

24. *Beltsville-Hilly and Steep land, loamy and gravelly sediments-Matapeake association*

Mostly nearly level and undulating, moderately well drained soils with hardpan and including small areas of hilly land and deep, well-drained soils.—Most of this association is in the southeastern part of the county. The undulating Beltsville soils make up 60 percent of the association. These soils and the Hilly and Steep land, loamy and gravelly sediments, are on the moderately high and high Coastal Plain terraces that are underlain by sand, silt, clay, and gravel, mainly fluvial in origin. The Matapeake soils have formed from sand, silt, and clay on the lower Coastal Plain terraces and are of marine origin.

The Beltsville soils are best suited to pasture, mixed hay, and small grains. The Hilly and Steep land is best suited to forest or pasture, and the well-drained Matapeake soils are suited to all crops grown in the area.

Except the Matapeake, these soils are poorly suited as material for many types of construction. This association is mostly in cutover hardwood forest, but a large area is in urban developments. Supplies of water are obtained mostly from wells, small creeks, and springs. Wells are the most important source, and they are easily dug.

Engineering Properties of the Soils

This soil survey report of Fairfax County, Va., contains information that can be used by engineers to—

1. Make soil and land-use studies that will aid in the selection and development of industrial, business, residential, and recreational sites.
2. Make preliminary estimates of the engineering properties of soils in planning agricultural drainage systems, farm ponds, irrigation systems, and diversion terraces.
3. Make reconnaissance surveys of soil and ground conditions that will aid in locating highways and airports and in planning detailed soil surveys for their intended locations.
4. Locate sources of sand and gravel.
5. Correlate pavement performance with types of soil and thus develop information that will be useful in designing and maintaining pavements.

TABLE 6.—*Engineering*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth from surface	Horizon	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Appling loam:						
Three-tenths of a mile south of junction of State Highways 647 and 123.	Granite gneiss	S30651	1–7	A_2	116	12
		S30652	12–20	B_2	106	18
		S30653	32–40	C_1	106	18
Beltsville loam:						
Near Pohick Station, 100 yards west of Route 638.	Sand, silt, and clay of Coastal Plain terrace.	S30674	0–8	A_p	116	13
		S30675	8–19	A_3, B_{21}, B_{22}	116	15
		S30676	19–27	B_{m1}	125	10
		S30677	27–56	B_{m2}	117	14
		S30678	56–74	C_1	113	15
Bermudian silt loam:						
Sample for Fairfax quadrangle—1946	Alluvium from Triassic soils	70942	2–6	Layer 1	103	20
		70943	6–19	Layer 2	105	18
		70944	19–51	Layer 3	108	17
Birdsboro silt loam:						
Profile resembles Bucks silt loam [6]	Alluvium on terraces		0–7			
			7–52			
Bowmansville silt loam:						
Poorly drained first bottom [6]	Alluvium from Triassic soils		0–10			
			10–25			
			25–36			
Brecknock loam:						
Sample for Fairfax quadrangle—1946	Baked gray Triassic shale	70933	2–9	A_p	111	16
		70934	9–18	B_2	115	15
		70941	18–24	C	107	17
Bremo silt loam [6]	Greenstone		0–12			

See footnotes at end of table.

6. Determine the suitability of soil units for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from other published maps and reports and aerial photographs, for the purpose of making soil maps and reports that can be used readily by engineers.
8. Estimate the nature of material encountered when excavating for buildings and other structures.
9. Determine the suitability of soils for septic-tank sewage disposal systems.

The mapping and the descriptive report are somewhat generalized, however, and should be used only in planning more detailed field surveys to determine the in-place condition of the soil at the site of the proposed engineering construction.

Some of the terms used by the soil scientist may be unfamiliar to the engineer, and some words—for example, soil, clay, silt, sand—may have special meaning in soil science. These and other terms used in the report are defined in the Glossary at the end of the report.

Soil Test Data

To be able to make the best use of the soil map and soil survey report, the engineer should know the physical properties of the soil materials and the in-place condition of the soil. After testing soil materials and observing their behavior in engineering structures, the engineer can develop design recommendations for the soil units delineated on the map.

Many soils in Fairfax County were tested according to standard procedures to help evaluate them for engineering purposes (table 6). The engineering classifications in table 6 are based on data obtained by mechanical analyses and on tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods. Percentages of clay obtained by hydrometer method should not be used in naming textural classes for soil classification.

The liquid limit and plastic limit tests measure the effect of water on the consistence of soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a solid to a semisolid or plastic state. As the moisture content is further increased, the material changes from the plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from a solid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

test data [1]

Mechanical analysis [2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]							Percentage smaller than [3]						AASHO [4]	Unified [5]
2 inch	1½ inch	⅜ inch	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
------	------	------	100	98	86	59	56	44	21	14	22	3	A-4(5)	ML.
------	------	100	99	93	82	64	61	56	46	39	54	26	A-7-6(14)	MH-CH.
------	------	100	98	89	76	55	52	43	29	25	54	20	A-7-5(9)	MH.
------	------	------	------	100	95	64	61	46	21	12	20	2	A-4(6)	ML.
------	------	------	------	100	96	70	67	52	34	24	30	12	A-6(8)	CL.
------	------	------	------	100	93	52	48	38	22	15	17	4	A-4(3)	ML-CL.
------	------	------	------	100	92	54	51	44	33	27	30	11	A-6(4)	CL.
------	------	------	------	100	94	44	41	37	29	26	32	12	A-6(2)	SC.
------	------	------	------	100	99	91	------	------	43	------	38	13	A-6(9)	ML-CL.
------	------	------	------	100	98	88	------	------	41	------	35	13	A-6(9)	ML-CL.
------	------	------	------	100	97	73	------	------	30	------	36	14	A-6(9)	CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	ML-CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6, A-7	CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	ML-CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6, A-7	CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6	CL.
------	100	92	92	91	85	67	------	------	21	------	26	5	A-4(6)	ML-CL.
------	------	------	------	100	95	80	------	------	31	------	25	7	A-4(8)	ML-CL.
------	------	------	------	100	97	54	------	------	9	------	25	NP [7]	A-4(4)	ML.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6	CL.

TABLE 6.—*Engineering*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth from surface	Horizon	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Bucks loam: Two miles southeast of Chantilly; Fairview farm. No. 5.	Red Triassic sandstone and shale.	S30687	0–9	A_p	116	13
		S30688	9–19	B_2	116	14
		S30689	19–54	B_3	114	15
		S30690	54–74	C_2	107	19
Bucks silt loam: Two miles west of Centreville, along U.S. Highways 29 and 211.	Red Triassic shale	S30718	0–8	A_p	111	16
		S30719	8–55	B_2, B_3	101	22
Calverton silt loam: Two miles northwest of Chantilly; 400 yards west of Route 607.	Red Triassic shale	S30662	0–9	A_p	104	18
		S30663	9–24	B_{21}, B_{22}	102	23
		S30664	24–30	B_{2m}	97	26
		S30665	30–37	C	100	23
Catlett gravelly silt loam: Resembles Penn silt loam [6]	Baked gray Triassic shale		0–7			
			7–14			
Chewacla silt loam: Sample for Fairfax quadrangle—1946	Alluvium	71048	2–17	Layer 1	94	25
		71049	17–48	Layer 2	102	22
Colfax loam [6]	Granite and gneiss		0–10			
			10–48			
			48+			
Croton silt loam [6]	Red, brown, and gray Triassic shale.		0–9			
			9–34			
			34+			
Elbert silt loam: One-quarter mile west of Route 657 and 200 yards south of Route 665.	Diabase	S30679	0–5	A_p	106	19
		S30680	5–10	AB	106	18
		S30681	10–20	B_{2m}	88	29
		S30682	20–32	B_{3m}	96	25
		S30683	32–36	C	107	20
Elioak silt loam: One-half mile east of Dranesville on Route 717.	Sericite schist	S30671	0–9	A_2, A_3	106	17
		S30672	12–35	B_{22}	100	23
		S30673	50–55	C_2	103	21
Elkton silt loam: Data taken from sample in Norfolk County, Va.	Sand, silt, and clay of Coastal Plain.	90523	4–11	A_2	107	16
		90524	11–39	B_{2g}	112	15
		90525	49–60	C	116	13
Enon silt loam: Southwest of Oakton; 0.75 mile west of Route 655 along Route 664.	Mixed basic and acidic schist and metabasalt.	S30708	0–6	A_p	114	14
		S30709	9–20	B_2	108	19
		S30710	32–42	C	112	16
Fairfax silt loam: In woods along Route 620; 0.5 mile west of State Highway No. 123.	Sand, silt, and clay of Coastal Plain terrace overlying schist and granite.	S30711	1–7	A_2	112	13
		S30712	10–28	B_{21}, B_{22}	107	18
		S30713	28–42	C_1	110	16
		S30714	42–60	D_1	105	19
Galestown loamy fine sand: Three-fourths mile southeast of Gunston Hall, along Route 242.	Mostly sands of Coastal Plain.	S30720	0–8	A_p	114	12
		S30721	8–48	B-C	112	12
Glenelg silt loam: One-quarter mile east of Dranesville, along Va. Highway No. 7.	Sericite schist	S30701	2–7	A_2	108	16
		S30702	13–22	B_2	102	21
		S30703	28–72	C	99	20
Glenville silt loam: Special sample—Fairfax County	Sericite schist		0–3	A_p		
			3–27	A_3, B		
			27+	C	107	16

See footnotes at end of table.

test data [1]—Continued

Mechanical analysis [2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]							Percentage smaller than [3]						AASHO [4]	Unified [5]
2 inch	1½ inch	⅜ inch	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
------	------	------	------	100	98	60	51	35	22	16	23	3	A-4(5)	ML.
------	------	------	------	100	98	62	55	43	29	23	29	9	A-4(5)	CL.
------	------	------	------	100	97	52	45	34	23	16	28	7	A-4(3)	ML-CL.
------	------	------	------	100	97	88	83	63	35	26	38	11	A-6(8)	ML.
------	------	------	100	95	86	83	81	59	31	23	32	9	A-4(8)	ML-CL.
------	------	------	------	100	98	97	95	77	53	41	54	24	A-7-5(16)	MH-CH.
------	------	------	------	100	97	95	92	73	37	24	33	8	A-4(8)	ML-CL.
------	------	------	------	100	98	97	96	82	57	44	50	23	A-7-6(15)	ML-CL.
------	------	------	100	98	93	91	90	81	63	51	58	28	A-7-5(19)	MH-CH.
------	100	86	74	52	48	45	44	40	30	23	48	22	A-7-6(6)	SM-SC.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	ML.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4, A-6	CL.
------	------	------	------	100	98	87	------	------	35	------	46	15	A-7-5(11)	ML.
------	------	------	------	100	98	85	------	------	39	------	48	18	A-7-5(13)	ML.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4, A-6	ML-CL or CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6, A-7	SC or CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4, A-6	SC or CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4, A-6	ML-CL or CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6, A-7	CH-CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6	CL.
------	------	------	100	97	90	83	81	68	45	32	40	17	A-6(11)	CL.
------	------	------	100	96	89	82	79	40	44	30	40	18	A-6(11)	CL.
------	------	------	------	100	99	91	89	82	70	62	94	60	A-7-5(20)	CH.
------	------	------	------	100	93	67	62	50	41	34	57	29	A-7-6(17)	MH-CH.
------	------	------	100	97	78	46	40	29	24	17	40	15	A-6(4)	SM-SC.
------	100	97	96	94	91	82	77	60	33	21	30	6	A-4(8)	ML-CL.
------	100	97	95	93	91	84	83	72	54	46	55	22	A-7-5(16)	MH.
100	98	81	76	70	66	50	45	34	18	13	42	2	A-5(3)	SM.
------	------	------	------	------	100	91	83	54	27	19	30	8	A-4(8)	ML-CL.
------	------	------	------	------	100	92	84	62	36	29	34	17	A-6(11)	CL.
------	------	------	------	------	100	81	62	24	17	15	23	6	A-4(8)	ML-CL.
100	97	88	86	78	70	58	52	38	18	12	27	5	A-4(5)	ML-CL.
------	------	------	100	98	92	84	81	68	49	35	48	24	A-7-6(15)	CL.
------	100	98	97	93	88	81	78	63	39	25	35	13	A-6(9)	ML-CL.
------	100	91	87	83	79	63	53	35	19	12	23	3	A-4(6)	ML.
------	100	97	96	94	91	74	67	54	43	37	51	23	A-7-6(15)	MH-CH.
------	100	93	89	85	82	69	62	48	35	28	42	16	A-7-6(10)	ML-CL.
------	------	------	------	------	100	81	69	54	39	32	49	18	A-7-5(13)	ML.
------	------	------	------	100	95	19	17	15	13	8	NP [7]	NP [7]	A-2-4(0)	SM.
------	------	------	------	100	95	18	16	14	10	6	NP [7]	NP [7]	A-2-4(0)	SM.
------	100	94	91	89	87	70	62	42	24	16	30	5	A-4(7)	ML.
------	100	98	97	96	94	80	74	57	38	29	48	17	A-7-5(12)	ML.
------	------	------	100	99	98	82	72	41	15	8	46	5	A-5(9)	ML.
------	------	100	96	95	86	53	------	------	------	------	NP [7]	NP [7]	A-4(4)	ML.
------	100	98	97	96	90	66	------	------	------	------	28	7	A-4(6)	ML-CL.
100	97	88	84	73	70	50	------	------	------	------	NP [7]	NP [7]	A-4(3)	SM.

TABLE 6.—*Engineering*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth from surface	Horizon	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Hiwassee silt loam: Data taken from sample in Rappahannock County, Va.	Alluvium on terrace		0–5	A_p	101	20
			15–67	B_2	91	29
Huntington silt loam: This soil resembles Congaree silt loam [6]	Alluvium, pH above 7.0		0–50			
			50+			
Iredell silt loam: One mile south of U.S. Highways No. 211 and 29, along Route 621.	Diabase	S30657	0–7	A_p	111	16
		S30658	11–26	B_2	93	26
		S30659	29–32	C	120	15
Kelly silt loam: One-quarter mile south of Route 606; 200 yards east of Route 605.	Mixed Triassic shale and diabase.	S30704	0–7	A_p	107	17
		S30705	7–16	B_{21}	109	18
		S30706	16–25	B_{22}	101	22
		S30707	25–39	B_{m1}, B_{m2}	87	30
Lenoir silt loam: One-half mile south of Route 600, along private road.	Sand, silt, and clay of Coastal Plain.	S30697	1–6	A_2	101	20
		S30698	6–15	B_{21}	108	18
		S30699	15–40	B_{22}	99	23
		S30700	47–67	C	116	14
Lindside silt loam: Data taken from sample in Maury County, Tenn.	Alluvium, pH above 7.0	88227	0–24	Layer 1	108	17
		88228	24+	Layer 2	106	19
Lloyd loam: Data taken from sample in Alamance County, N.C.	Greenstone, schist	S31343	0–3	A_1	91	24
		S31344	14–31	B_{22}	90	29
		S31345	31+	B_3	94	25
Louisburg coarse sandy loam: Data taken from sample in Nottoway County, Va.	Granite gneiss	91501	3–16	A_2	122	9
		91502	16–26	C	119	11
Lunt fine sandy loam: One-quarter mile south of Lorton, along R.F. and P. Railroad.	Sand, silt, and clay of Coastal Plain.	S30715	0–9	A_p	120	12
		S30716	12–26	B_{21}	106	18
		S30717	45–60	C	116	13
Manassas silt loam [6]	Colluvium from soils in Triassic area, mainly Penn and Bucks.		0–12			
			12–27			
			27–36			
Manor silt loam: One and one-half miles north of Clifton, on Route 660.	Sericite schist	S30669	0–8	A_p	107	17
		S30670	8–36	C	102	19
Masada gravelly loam	Alluvium on terraces		0–8			
			8–36			
			36+			
Matapeake silt loam: Two miles southwest of Gunston Hall	Sand, silt, and clay of Coastal Plain.	S30648	2–8	A_2	111	15
		S30649	22–38	B_2	111	17
		S30650	44–52	C_1	114	15
Mattapex silt loam: Moderately well drained soil [6].	Sand, silt, and clay of Coastal Plain.		0–8			
			8–34			
			34+			
Mayodan silt loam [6]	Triassic shale and sandstone.		0–12			
			12–36			
			36+			
Meadowville silt loam [6]	Colluvium		0–14			
			14–48			

See footnotes at end of table.

test data [1]—Continued

Mechanical analysis [2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]							Percentage smaller than [3]						AASHO [4]	Unified [5]
2 inch	1½ inch	⅜ inch	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
				100	85	66	45	27	12	7	37	4	A-4(6)	ML.
	100	99	99	99	97	90	89	85	77	71	59	21	A-7-5(16)	MH.
													A-4, A-6	ML-CL,CL.
													A-6	CL.
	100	98	98	98	86	76	72	54	28	17	27	5	A-4(8)	ML-CL.
				100	94	84	81	73	63	57	80	50	A-7-5(20)	CH.
			100	97	69	43	35	26	17	14	36	15	A-6(3)	SC.
			100	99	95	89	87	67	31	18	27	4	A-4(8)	ML-CL.
			100	98	94	90	89	73	44	30	38	14	A-6(10)	ML-CL.
			100	99	97	94	92	79	56	48	60	33	A-7-6(20)	CH.
				100	99	98	97	89	75	69	98	64	A-7-5(20)	CH.
				100	99	94	92	73	40	25	36	8	A-4(8)	ML.
					100	97	95	76	47	30	33	10	A-4(8)	ML-CL.
					100	96	94	82	66	53	59	30	A-7-6(20)	MH-CH.
				100	99	65	50	30	22	18	26	8	A-4(6)	CL.
			100	98	83	75	74	61	29	23	39	14	A-6(10)	ML-CL.
			100	99	93	85	82	71	38	30	42	19	A-7-6(12)	CL.
	100	98	98	97	92	79	73	51	26	20	47	12	A-2-4(0)	ML.
				100	99	95	93	85	71	61	80	36	A-7-5(10)	MH.
					100	98	96	80	55	42	63	25	A-7-5(18)	MH.
			100	97	65	30	25	18	12	7	18	1	A-2-4(0)	SM.
			100	99	67	30	24	16	10	8	23	NP [7]	A-2-4(0)	SM.
				100	64	41	39	31	20	13	29	6	A-4(1)	SM-SC.
				100	85	75	75	66	46	35	55	28	A-7-6(18)	CH.
100	89	76	69	62	43	27	25	22	19	15	49	24	A-2-7(2)	SC.
													A-4, A-6	ML-CL or CL.
													A-4, A-6	CL.
													A-4, A-6	ML-CL or CL.
	100	99	98	96	95	72	60	40	21	15	34	4	A-4(7)	ML.
				100	99	73	61	37	14	6	35	1	A-4(8)	ML.
													A-4	GM, ML.
													A-4, A-6	GC, CL.
													A-4, A-6	GC, CL.
				100	99	79	73	54	29	20	23	4	A-4(8)	ML-CL.
					100	77	69	55	41	33	37	15	A-6(10)	CL.
					100	68	58	40	29	24	29	9	A-4(7)	CL.
													A-4	ML-CL or CL.
													A-6	SC or CL.
													A-2, A-4	SC or SM.
													A-4, A-6	ML-CL. or CL.
													A-6, A-7	CL.
													A-7	SC or CL.
													A-4	ML-CL or CL.
													A-4, A-6	CL.

633368—63——6

TABLE 6.—*Engineering*

Soil name and location	Parent material	Bureau of Public Roads report No.	Depth from surface	Horizon	Moisture-density: Maximum dry density	Moisture-density: Optimum moisture
			Inches		*Lb. per cu. ft.*	*Percent*
Mecklenburg silt loam: One-half mile east of Bull Run, along U.S. Highways No. 29 and 211.	Diabase	S30684	0–8	A_p	107	19
		S30685	8–32	B_2, B_3	93	27
		S30686	32–48	C	119	15
Montalto silt loam: One mile north of Herndon, along Route 28.	Diabase	S30691	0–7	A_p	103	22
		S30692	7–18	B_2	96	27
		S30693	18–27	B_3	97	26
		S30694	27–37	C	104	21
Orange silt loam: One-half mile southwest of junction of Routes 620 and 655; along Route 620.	Greenstone	S30666	0–9	A_2	113	14
		S30667	9–23	B_{21}, B_{22}	116	15
		S30668	23–41	B_{2m}	91	28
Penn silt loam: One-quarter mile southwest of Floris School.	Triassic shale and siltstone	S30660	0–8	A_p	113	14
		S30661	8–19	C_1	115	14
		----------	19+	D	117	12
Raritan silt loam: Resembles Calverton silt loam [6]	Alluvium on Triassic terrace.	----------	0–8	----------	----------	----------
		----------	8–42	----------	----------	----------
Readington silt loam: Data taken from sample in Frederick County, Md.	Triassic shale and siltstone	S31470	0–7	A_p	100	21
		S31471	12–28	B_{22}	110	18
		S31472	34–48	C	113	16
Rowland silt loam: Special sample Fairfax County	Alluvium from Triassic soils	30722	0–8	Layer 1	112	16
		30723	14–21	Layer 2	112	15
		30724	21–36	Layer 3	115	15
Sassafras fine sandy loam: Data taken from sample in Norfolk Co., Va.	Sand, silt, and clay of Coastal Plain.	90526	4–10	A_2	122	10
		90527	14–26	B_2	117	14
		90528	38–50	C	111	12
Wehadkee silt loam	Alluvium	----------	0–10	----------	----------	----------
		----------	10–40	----------	----------	----------
		----------	40+	----------	----------	----------
Wickham loam [6]	Old alluvium from igneous rocks.	----------	0–10	----------	----------	----------
		----------	10–50	----------	----------	----------
Woodstown fine sandy loam [6]	Acid sand, silt and clay	----------	0–10	----------	----------	----------
		----------	10–38	----------	----------	----------
		----------	38+	----------	----------	----------
Worsham silt loam [6]	Alluvium from igneous rocks.	----------	0–7	----------	----------	----------
		----------	7–36	----------	----------	----------
		----------	36+	----------	----------	----------

[1] Tests performed by Bureau of Public Roads in accordance with standard procedures of the American Association of State Highway Officials (AASHO) (*1*).

[2] According to the American Association of State Highway Officials Designation: T 88. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 mm. in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 mm. in diameter is excluded from calculations of grain-size fractions. The mechanical analysis used in this table

test data [1]—Continued

Mechanical analysis [2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve [3]							Percentage smaller than [3]							
2 inch	1½ inch	⅜ inch	No. 4 (4.76 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO [4]	Unified [5]
------	100	99	98	98	90	75	71	56	34	22	35	11	A-6(8)	ML-CL.
------	------	------	------	100	92	79	75	63	48	40	61	28	A-7-5(19)	MH.
------	------	100	99	86	59	35	30	22	18	13	34	12	A-2-6(0)	SM-SC.
------	100	93	93	93	82	66	61	48	32	22	40	12	A-6(7)	ML.
------	100	98	98	98	92	76	72	61	49	42	52	22	A-7-5(15)	MH-CH.
------	------	------	------	100	89	68	63	52	41	36	52	22	A-7-5(13)	MH-CH.
------	100	97	96	94	73	52	48	37	27	24	45	16	A-7-6(6)	ML.
------	------	------	100	96	88	81	77	60	30	17	23	3	A-4(8)	ML.
------	------	100	99	92	84	77	72	54	30	19	29	9	A-4(8)	CL.
------	------	------	100	97	93	90	87	77	65	60	86	53	A-7-5(20)	CH.
------	------	------	100	99	93	84	78	50	26	16	27	4	A-4(8)	ML-CL.
------	------	------	------	100	98	87	77	46	22	15	26	3	A-4(8)	ML.
100	98	43	35	28	24	20	------	------	------	------	32	11	A-2-6(0)	GC.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	ML-CL or CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6	CL.
------	------	------	100	99	93	84	82	68	42	30	43	16	A-7-6(11)	ML-CL.
------	------	------	100	99	96	92	89	68	47	38	45	24	A-7-6(15)	CL.
------	100	98	97	95	91	86	84	66	43	32	38	19	A-6(12)	CL.
------	------	------	100	98	91	75	70	49	23	14	27	4	A-4(8)	ML-CL.
------	------	------	------	100	94	85	76	51	24	16	27	5	A-4(8)	ML-CL.
------	------	------	------	100	96	52	44	32	20	15	25	3	A-4(3)	ML.
------	------	------	------	100	97	41	38	27	15	9	15	2	A-4(1)	SM.
------	------	------	------	100	97	46	45	37	27	24	27	10	A-4(2)	SC.
------	------	------	------	100	97	13	13	13	11	10	NP [7]	NP [7]	A-2-4(0)	SM.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4, A-7	ML.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6	CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	SM, ML.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	ML.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4, A-6	SC.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	SM-SC or SM
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4, A-6	SC or CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-2, A-4	SM.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-4	ML-CL or CL.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-6, A-7	CL or CH.
------	------	------	------	------	------	------	------	------	------	------	------	------	A-7	MH.

is not suitable for use in naming textural classes for soils.

[3] Based on total material. Laboratory test data corrected for amount discarded in field sampling.

[4] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (pt. 1, ed. 7). The Classification and Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation: M 145-49.

[5] Based on the Unified Soil Classification System, Tech. Memo. No. 3-357, v. 1, Waterways Expt. Sta., Corps of Engin., March 1953 (*17*).

[6] Test data not available; engineering classifications are estimates.

[7] NP=Nonplastic.

Table 6 also gives compaction (moisture-density) data for the tested soils. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material will increase until the "optimum moisture content" is reached. After that, the density decreases with increase in moisture. The highest dry density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in earthwork, for, as a rule, optimum stability is obtained if the soil is compacted to about the maximum dry density when it is at approximately the optimum moisture content.

Engineering soil classification systems

Most highway engineers classify soil materials according to the system approved by the American Association of State Highway Officials (*1*). In this system soil materials are classified in seven principal groups. The groups range from A–1, which is gravelly soil of high bearing capacity, to A–7, which consists of clay soil having low strength when wet. In each group the relative engineering value of the soil material is indicated

TABLE 7.—*Features and estimated quality of*

[Dash indicates infor-

Soil type and map symbol	Percolation of water in presaturated soil [1]	Shrink-swell potential	Suitability as a source of—			
			Topsoil		Sand and gravel	Road fill
			Rating	Usable thickness		
	Minutes per inch			*Inches*		
Appling gritty loam (Aa, Ab, Ac)	20 to more than 60.	Low to moderate.	Fair	6	Unsuitable [2]	Fair
Beltsville silt loam (Bb)	More than 60	Low	Fair	7	Upper part not suitable; below depth of 8 feet is a suitable layer 10 to 20 feet thick.	Upper 4 to 5 feet fair; good below this depth.
Beltsville loam (Ba)	More than 60	Low	Fair	7	Upper part not suitable; below depth of 8 feet is a suitable layer 10 to 20 feet thick.	Upper 4 to 5 feet fair; good below this depth.
Bermudian silt loam (Bc)	More than 60	Low	Good	30	Unsuitable	Fair to poor
Birdsboro silt loam (Bd)	30 to more than 60.	Low to moderate.	Good	8	Unsuitable	Fair
Bowmansville silt loam (Be)	More than 60	Low to moderate.	Unsuitable	—	Poor; spotty deposits.	Poor to fair
Brecknock silt loam (Bh, Bk)	45 to more than 60.	Low	Good	8	Unsuitable	Fair
Brecknock loam (Bf, Bg)	10 to 30	Low	Good	8	Unsuitable	Fair
Bremo-Orange silt loams (Bm)	50 to more than 60.	High	Good	7	Unsuitable	Fair, except for very plastic, unsuitable layer at a depth of 2 to 4 feet.
Bucks silt loam (Bo)	40 to more than 60.	Moderate	Good	8	Unsuitable	Fair

See footnotes at end of table.

by a group index number. Group index numbers range from 0 for the best materials to 20 for the poorest. The group index number is shown in parentheses, following the soil group symbol, in the next to last column in table 6.

Some engineers prefer to use the Unified soil classification system (*17*). In this system, soil materials are identified as coarse grained, 8 classes; fine grained, 6 classes; and highly organic soils. An approximate classification of soils by this system can be made in the field. The last column in table 6 shows the classification of the tested soils according to the Unified system.

Suitability of Soils for Engineering Uses

Table 7 shows the features and estimated suitabilities of soil types in Fairfax County that affect engineering construction. The data in this table apply to the representative profiles of the stated soil types. Some of these representative profiles are described in the sections "Descriptions of the Soils" and "Classification and Morphology of the Soils." The present surface layer of the severely eroded phases is generally the second layer described in the representative profile. The data in table 7 are explained in the following paragraphs.

soils for engineering construction

mation not applicable]

Suitability for septic-tank drainage fields	Soil features affecting engineering practices—		Farm ponds	
	Airport and highway location	Footings for single-family dwellings	Reservoir area	Embankment
Marginal; porous strata usually more than 5 feet below surface.	In places, shallow to bedrock and steep slopes.	Few unfavorable features.	Few unfavorable features.	Few unfavorable features.
Poor; hardpan [3]	Compact layer;[4] seepage in cut slopes.	Few unfavorable features.	Care needed to prevent excavating through hardpan layer, which is underlain by gravel.	Coarse-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; hardpan [3]	Compact layer;[4] seepage in cut slopes.	Few unfavorable features.	Care needed to prevent excavating through hardpan layer, which is underlain by gravel.	Coarse-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; flood plain, high water table.	Subject to flooding	Unsuitable; flood plain	Nearly all ponds in this soil are dug; care needed to prevent seepage into streams.	Coarse-textured material suitable for outer shell but not suitable as clay core sealer.
Marginal; some areas have fragipan.	Shallow to bedrock in places.	Few unfavorable features.	Few unfavorable features.	Few unfavorable features.
Poor; flood plain, high water table.	Subject to flooding; seepage.	Unsuitable; flood plain	Few unfavorable features.	Few unfavorable features.
Marginal; hard shale often prevents movement of water.	Shallow to bedrock	Few unfavorable features.	Possible seepage through underlying shale.	Coarse-textured material; suitable for outer shell but not suitable as clay core sealer.
Good	Shallow to bedrock	Few unfavorable features.	Possible seepage through underlying shale.	Coarse-textured material; suitable for outer shell but not suitable as clay core sealer.
Marginal; many places have hard rock or subsoil has swelling type of clay.	Outcrops of bedrock; plastic claypan in places.	Subsoil has swelling type of clay in some places; all footings should be placed below this clay layer.	Rock near surface; schist in places may result in seepage.	Few unfavorable features.
Marginal; hard shale often prevents movement of water.	Shallow to bedrock	No unfavorable features.	No unfavorable features.	Medium-textured material; suitable for outer shell but not suitable as clay sealer.

TABLE 7.—*Features and estimated quality of*

Soil type and map symbol	Percolation of water in presaturated soil [1]	Shrink-swell potential	Suitability as a source of— Topsoil: Rating	Topsoil: Usable thickness	Sand and gravel	Road fill
	Minutes per inch			*Inches*		
Bucks loam (Bn)	20 to 35	Low	Good	9	Unsuitable	Fair to good
Calverton silt loam (Cb, Cc)	More than 60	Moderate to high.	Fair	7	Unsuitable	Poor to fair
Calverton loam (Ca)	More than 60	Moderate	Fair	7	Unsuitable	Poor to fair
Catlett gravelly silt loam (Cd, Ce, Cf).	More than 60	Low	Good	7	Unsuitable [2]	Good
Chewacla silt loam (Cg)	More than 60	Low	Good	12	Unsuitable	Fair to good; upper 2 to 5 feet erodible.
Colfax loam (Ch)	More than 60	Low to moderate.	Fair	6	Unsuitable	Poor to fair
Croton silt loam (Ck)	More than 60	Moderate to high.	Unsuitable.		Unsuitable	Poor to fair
Elbert silt loam (Ea)	More than 60	High to very high.	Unsuitable.		Unsuitable [2]	Poor to fair, except for very plastic, unsuitable layer at a depth of 1 to 5 feet.
Elioak silt loam (Eb, Ec, Ed, Ee)	20 to 40	Low to moderate.	Good	7	Unsuitable	Poor to fair; highly erodible; difficult to compact.
Elkton silt loam (Ef)	More than 60	Moderate to high.	Unsuitable.		Unsuitable	Poor
Enon silt loam (Eg, Eh)	40 to more than 60.	Moderate to high.	Good	7	Unsuitable	Fair, except subsoil is poorly suited.
Fairfax silt loam (Fb, Fc)	25 to more than 60.	Low to moderate.	Good	7	Unsuitable	Fair
Fairfax loam (Fa)	25 to more than 60.	Low to moderate.	Fair	7	Unsuitable	Fair
Galestown loamy fine sand (Ga)	1 to 4	Low	Fair	10	Good source of sand.	Good
Glenelg silt loam (Gb, Gc, Gd, Ge, Gf).	5 to 25	Low	Good	7	Unsuitable	Poor to fair; highly erodible; difficult to compact.
Glenville silt loam (Gg)	More than 60	Low	Good	7	Unsuitable	Poor to fair; erodible.

See footnotes at end of table.

soils for engineering construction—Continued

Suitability for septic-tank drainage fields	Soil features affecting engineering practices— Airport and highway location	Footings for single-family dwellings	Farm ponds: Reservoir area	Farm ponds: Embankment
Good	Shallow to bedrock	No unfavorable features	Few unfavorable features	Medium-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; fragipan and high water table.	Compact layer;[4] seepage in cut slopes; shallow to bedrock.	Not suitable for basements because water table is high.	Few unfavorable features	No unfavorable features.
Poor; fragipan and high water table.	Compact layer;[4] seepage in cut slopes; shallow to bedrock.	Not suitable for basements because water table is high.	Few unfavorable features	Medium-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; hard shale near surface.	Shallow to bedrock; steep slopes in places.	Few unfavorable features	Possible seepage through shale bedrock.	Coarse-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; flood plain, high water table.	Subject to flooding	Unsuitable; flood plain	Nearly all ponds in this soil are dug; care needed to prevent seepage into streams.	Medium-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; fragipan and high water table.	Compact layer;[4] plastic subsoil in places.	Not suitable for basements because water table is high.	No unfavorable features	Few unfavorable features.
Poor; high water table	High water table; seepage; shallow to bedrock; plastic subsoil in places.	Not suitable for basements because water table is high; soft clay subsoil in places requires spread footings.	No unfavorable features	Few unfavorable features.
Poor; high water table; subsoil has swelling type of clay.	High water table; seepage; plastic subsoil; shallow to bedrock.	Unsuitable for basements; shrinking and swelling of clay can cause much damage to buildings.	No unfavorable features	Few unfavorable features.
Good; porous strata sometimes below depth of 4 feet.	Highly erodible in cut slopes; bedrock ranges from shallow to deep from surface; steep slopes in places.	No unfavorable features	Seepage through parent material causes ponds to go dry.	Few unfavorable features.
Poor; high water table; subsoil consists of swelling type of clay.	High water table; seepage over clay layer.	Not suitable for basements; shrinking and swelling of clay can cause much damage to buildings.	Few unfavorable features	Few unfavorable features.
Marginal; subsoil has swelling type of clay in many places.	Shallow to bedrock; plastic subsoil; steep slopes in places.	All footings should be in places below soft, plastic clay subsoil.	Few unfavorable features	Few unfavorable features.
Marginal; has fragipan	Compact layer;[4] seepage in cut slopes.	No unfavorable features	Few unfavorable features	No unfavorable features.
Marginal; has fragipan	Compact layer;[4] seepage in cut slopes.	No unfavorable features	Few unfavorable features	No unfavorable features.
Good	No unfavorable features	No unfavorable features	Unsuitable; excessive seepage.	Low stability; piping is a hazard.
Good	Highly erodible in cut slopes; steep slopes in places.	No unfavorable features	Seepage through parent material (loose mica schist) causes ponds to go dry.	Medium-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; high water table	High water table	Not suitable for basements because water table is high.	No unfavorable features	No unfavorable features.

TABLE 7.—*Features and estimated quality of*

Soil type and map symbol	Percolation of water in presaturated soil [1]	Shrink-swell potential	Suitability as a source of—			
			Topsoil		Sand and gravel	Road fill
			Rating	Usable thickness		
	Minutes per inch			*Inches*		
Huntington silt loam (Hb)	More than 60	Low to moderate.	Good	36	Unsuitable	Fair
Iredell-Mecklenburg silt loams (Ib, Ic, Ia, Id, Ie).	More than 60	High to very high; substratum low.	Fair	7	Unsuitable [2]	Fair, except for very plastic, unsuitable layer at a depth of ½ to 3 feet.
Kelly silt loam (Ka)	More than 60	High to very high; substratum low.	Fair	7	Unsuitable [2]	Fair, except for very plastic, unsuitable layer at a depth of ½ to 5 feet.
Lenoir silt loam (La)	More than 60	Moderate to high.	Fair	6	Unsuitable	Poor to fair
Lindside silt loam (Lb)	More than 60	Low to moderate.	Good	12	Unsuitable	Poor to fair
Lloyd loam (Lc)	20 to 45	Moderate to high.	Good	7	Unsuitable	Poor to fair
Louisburg coarse sandy loam (Ld, Le, Lf).	10 to 25	Low	Fair	7	Unsuitable [2]	Fair to good; rock fragments.
Lunt fine sandy loam (Lg, Lh, Lk)	10 to more than 60.	Variable; ranges from low to high.	Good	7	Unsuitable	Variable; ranges from poor to good.
Manassas silt loam (Ma)	More than 60	Low	Good	24	Unsuitable	Fair
Manor silt loam (Mb, Mc, Md, Me)	5 to 20	Low	Good	7	Unsuitable	Poor to fair; highly erodible; difficult to compact.
Marsh (fresh water) (Mf)	More than 60	Low	Unsuitable		Unsuitable	Unsuitable
Masada gravelly loam (Mg)	30 to more than 60.	Low	Fair	7	Variable; unsuitable to fair.	Good
Matapeake silt loam (Mh, Mk)	30 to more than 60.	Low to moderate.	Good	9	Unsuitable	Fair
Mattapex silt loam (Mm, Mn)	More than 60	Low to moderate.	Good	9	Unsuitable	Fair
Mayodan silt loam (Mo)	20 to more than 60.	Low to moderate.	Fair	7	Unsuitable	Fair
Meadowville silt loam (Mp)	More than 60	Low	Good	24	Unsuitable	Fair

See footnotes at end of table.

soils for engineering construction—Continued

Suitability for septic-tank drainage fields	Soil features affecting engineering practices—			
	Airport and highway location	Footings for single-family dwellings	Farm ponds	
			Reservoir area	Embankment
Poor; flood plain, high water table.	Subject to flooding	Unsuitable; flood plain	Nearly all ponds in this soil are dug; care needed to prevent seepage into streams.	Medium-textured material; suitable for outer shell but not suitable as clay core sealer.
Poor; subsoil has swelling type of clay.	Shallow to bedrock; plastic subsoil; claypan in Iredell; boulders.	All footings should be placed on rock below the soft, plastic clay subsoil.	No unfavorable features	No unfavorable features.
Poor; subsoil has swelling type of clay.	Shallow to bedrock; plastic claypan in subsoil.	Spread footings may be necessary in some places over plastic clay layers.	No unfavorable features	No unfavorable features.
Poor; high water table; subsoil has swelling type of clay.	Plastic subsoil; high water table.	Not suitable for basements because water table is high.	No unfavorable features	No unfavorable features.
Poor; flood plain, high water table.	Subject to flooding	Unsuitable; flood plain	Nearly all ponds in this soil are dug; care needed to prevent seepage into streams.	No unfavorable features.
Good	Shallow to bedrock	No unfavorable features	No unfavorable features	No unfavorable features.
Good; slopes or hard rock may prevent installing drainage field.	Shallow to bedrock; steep slopes in places.	No unfavorable features	Unsuitable; excessive seepage.	Coarse-textured material; suitable for outer shell but not suitable as clay core sealer.
Marginal; this is a complex which ranges from sand to clay.	Steep slopes; texture ranges from sand to clay.	Spread footings may be necessary in areas having soft, plastic clay subsoil.	Variable; soil complex	Variable; soil complex.
Poor; high water table.	Shallow to bedrock; seepage; high water table.	Not suitable for basements. Footings should go through all of organic topsoil.	Seepage in some areas	Medium-textured material; suitable for outer shell but unsuitable as clay core sealer.
Good	Highly erodible in cut slopes; steep slopes in places.	No unfavorable features	Most areas unsatisfactory because of excessive seepage.	Medium-textured material; suitable for outer shell but unsuitable as clay core sealer.
Poor; under water	Marsh; high water table	Unsuitable; under water most of time; has low bearing capacity.	No unfavorable features	Unsuitable.
Marginal; hardpan in many places.	Compact layer in places; steep slopes in places.	No unfavorable features	No unfavorable features	Medium- to coarse-textured material; suitable for outer shell but unsuitable as clay core sealer.
Marginal; fragipan in places.	No unfavorable features	No unfavorable features	No unfavorable features	No unfavorable features.
Poor; high water table	High water table	Not suitable for basements because water table is high.	No unfavorable features	No unfavorable features.
Marginal; this is a complex which ranges from sandy gravel to clay.	Compact layer in places	No unfavorable features	Seepage in gravelly and sandy areas.	Medium- to coarse-textured material; suitable for outer shell but unsuitable as clay core sealer.
Poor; high water table	Seepage in places; high water table.	Not suitable for basements. Footings should extend below the organic topsoil.	Seepage through parent material.	Medium-textured material; suitable for outer shell but unsuitable as clay core sealer.

TABLE 7.—*Features and estimated quality of*

Soil type and map symbol	Percolation of water in presaturated soil [1]	Shrink-swell potential	Suitability as a source of— Topsoil: Rating	Topsoil: Usable thickness	Sand and gravel	Road fill
				Inches		
Mixed alluvial land (Mr)	More than 60	Variable	Unsuitable		Unsuitable	Variable
Montalto silt loam (Ms)	15 to 30	Moderate to high.	Good	7	Unsuitable [2]	Fair, except subsoil is poorly suited.
Orange silt loam (Oa)	More than 60	High to very high; substratum low.	Fair	7	Unsuitable	Fair, except for very plastic, unsuitable layer at a depth of ½ to 4 feet.
Penn loam (Pd, Pe, Pf)	5 to 30	Low	Good	7	Unsuitable	Fair; rock fragments
Penn fine sandy loam (Pa, Pb, Pc)	5 to 25	Low	Good	7	Unsuitable	Fair; rock fragments
Penn silt loam (Pm, Pn, Po)	10 to 50	Low	Good	7	Unsuitable	Fair; rock fragments
Penn shaly silt loam (Pg, Ph, Pk)	More than 60	Low	Unsuitable		Unsuitable	Fair; rock fragments
Raritan silt loam (Ra)	More than 60	Moderate	Fair	7	Unsuitable	Poor to fair
Readington silt loam (Rb)	More than 60	Low	Good	7	Unsuitable	Poor to fair
Rocky land (basic) (Rc)	More than 60	Variable	Unsuitable		(2)	Variable
Rocky land (acidic) (Rd, Re)	40 to more than 60.	Variable	Unsuitable		(2)	Variable
Rowland silt loam (Rg)	More than 60	Low	Good	12	Unsuitable	Poor to fair; erodible.
Sassafras fine sandy loam (Sa, Sb, Sc).	10 to 45	Low	Good	10	Fair source of sand below depth of 4 feet.	Good
Hilly, Rolling, and Steep lands, loamy and gravelly sediments (Ha, Rf, Sd).	10 to more than 60.	Variable	Unsuitable		Variable; unsuitable to good.	Variable
Very rocky land (acidic rock) (Va)	More than 60	Variable	Unsuitable		(2)	Variable
Very rocky land (basic rock) (Vb)	More than 60	Variable	Unsuitable		(2)	Variable
Wehadkee silt loam (Wa)	More than 60	Low to moderate	Unsuitable		Unsuitable	Poor
Wickham-Hiwassee loams complex (Wb).	10 to more than 60.	Low to moderate	Good	8	Unsuitable	Fair
Woodstown fine sandy loam (Wc, Wd).	More than 60	Low	Good	9	Unsuitable	Good
Worsham silt loam (We)	More than 60	Moderate to high.	Unsuitable		Unsuitable	Poor

[1] Tests performed in presaturated soils that are wetted thoroughly at least 24 hours prior to percolation test.
[2] Underlying bedrock in some places is a possible source of crushed rock.

soils for engineering construction—Continued

Suitability for septic-tank drainage fields	Soil features affecting engineering practices—			
	Airport and highway location	Footings for single-family dwellings	Farm ponds	
			Reservoir area	Embankment
Poor; high water table	Subject to flooding	Unsuitable; flood plain	Variable; many areas not suitable for dug ponds; excess seepage through underlying material.	Variable; not suitable as clay core sealer.
Good	Shallow to bedrock	No unfavorable features	No unfavorable features	No unfavorable features.
Poor; subsoil has swelling type of clay.	Shallow to bedrock; plastic claypan in subsoil.	All footings should be placed on rock below the soft, plastic clay subsoil.	No unfavorable features	No unfavorable features.
Good	Shallow to bedrock; steep slopes.	No unfavorable features	Seepage through underlying shale in some places.	Coarse-textured material; suitable for outer shell but unsuitable as clay core sealer.
Good	Shallow to bedrock; steep slopes.	No unfavorable features	Seepage through underlying shale in some places.	Coarse-textured material; suitable for outer shell but unsuitable as clay core sealer.
Good	Shallow to bedrock; steep slopes.	No unfavorable features	Seepage through underlying shale in some places.	Coarse-textured material; suitable for outer shell but unsuitable as clay core sealer.
Poor; hard shale near surface.	Shallow to bedrock; steep slopes.	No unfavorable features	Seepage through underlying shale in some places.	Coarse-textured material; suitable for outer shell but unsuitable as clay core sealer.
Poor; high water table	Occasionally flooded; high water table.	Not suitable for basements because water table is high.	No unfavorable features	No unfavorable features.
Poor; high water table	Shallow to bedrock; high water table.	Not suitable for basements because water table is high.	No unfavorable features	Medium-textured material; suitable for outer shell but unsuitable as clay core sealer.
Poor; swelling type of clay; outcrops of bedrock.	Outcrops of bedrock; steep slopes.	Hard rock in places may require blasting.	Unsuitable; seepage through bedrock.	Unsuitable.
Poor; outcrops of bedrock.	Outcrops of bedrock; steep slopes.	Hard rock in places may require blasting.	Unsuitable; seepage through bedrock.	Unsuitable.
Poor; flood plain; high water table.	Subject to flooding; high water table.	Unsuitable; flood plain	Nearly all ponds in this soil are dug; care needed to prevent seepage into streams.	Medium-textured material; suitable for outer shell but unsuitable as clay core sealer.
Good	Few unfavorable features	Few unfavorable features	Excess seepage through porous, underlying strata of sand.	Low stability; piping is a hazard.
Marginal; ranges from sandy gravel to clay.	Subject to slides in many places.	Subject to landslides. Some houses completely destroyed.	Variable; excess seepage in gravelly and sandy areas.	Variable; many areas have porous strata of sand and gravel.
Poor; outcrops of bedrock.	Bedrock outcrop; steep slopes.	Hard rock in places may require blasting.	Unsuitable; seepage through bedrock.	Unsuitable.
Poor; outcrops of bedrock.	Bedrock outcrop; steep slopes.	Hard rock in places may require blasting.	Unsuitable; seepage through bedrock.	Unsuitable.
Poor; flood plain; high water table.	Subject to flooding, high water table.	Unsuitable; flood plain	No unfavorable features	No unfavorable features.
Marginal; fragipan in places.	No unfavorable features	No unfavorable features	No unfavorable features	No unfavorable features.
Poor; high water table	High water table	Not suitable for basements because water table is high.	Excess seepage through porous sand.	Low stability; piping is a hazard.
Poor; high water table	High water table	Not suitable for basements because water table is high.	No unfavorable features	No unfavorable features.

[3] Seepage pits can be used 50 percent of time if public water is available.
[4] Compact layers cause high water table during wet periods.

Data in the column "Percolation of water in presaturated soil" were obtained from field percolation tests run by the Fairfax County Health Department or by C. S. Coleman, Fairfax County soil scientist. The values are in minutes required for the soil to absorb 1 inch of moisture. Soil is considered satisfactory for septic-tank drainage fields if it can absorb 1 inch of water in 60 minutes or less.

The shrink-swell potential indicates the change in soil volume that can be expected with a change in moisture content. It is estimated primarily on the basis of the amount and type of clay in the soil. As a rule, soils classified as CH and A–7 have a "High" shrink-swell potential. The subsoil of Iredell-Mecklenburg and Kelly soils is rated "Very high" because these soils are very sticky when wet (high in montmorillonite) and develop extensive shrinkage cracks when they become dry. Clean sand and gravel (single-grain structure) and soils that have a small amount of nonplastic to slightly plastic, fine-textured material have a "Low" shrink-swell potential. Most other nonplastic to slightly plastic soil material also has a "Low" shrink-swell potential.

Topsoil is a presumed fertile soil or soil material usually rich in organic material, used to topdress roadbanks, lawns, and gardens. Soils are rated for suitability as a source of topsoil on the basis of texture and the content of organic material.

The ratings in the "Topsoil" column give the suitability of the soil for use in stabilizing road slopes, shoulders, and ditch lines by promoting the growth of vegetation. Loamy soils that are high in organic matter are rated as "Good." Those having a thin surface layer or a permanent high water table are rated as "Unsuitable." The column "Usable thickness" applies to the thickness of soil from the surface downward that is suitable for use as "topsoil."

The suitability ratings of soil as a source of sand or gravel are based mainly on a knowledge of soils that have provided suitable construction material in the past. The suitability of sand and gravel for base course, for subbase, or for concrete or asphalt mixtures must be determined by inspection of the specific deposits. Soils underlain by bedrock are indicated by a footnote, as this rock may be suitable for quarrying and for use in engineering structures. Quarries have been developed in diabase, granite, and in some of the syenites. The baked sandstones and shales have been used as a source of crushed rock in adjacent counties and might be a possible source of rock for crushing in this county.

The suitability of soil as material for road fill depends largely on its texture and its natural water content. Very plastic soils high in natural water content are difficult to handle, to dry, and to compact. Consequently, they are rated "Poor." The subsoil of the Elbert, Iredell-Mecklenburg, Kelly, and Orange soils and other very plastic soils with a high shrink-swell potential are rated "Unsuitable." Highly erodible soils composed mainly of fine sand or silt, such as Elioak and Glenelg, require moderately gentle slopes, close moisture control while compacting, and rapid revegetation of side slopes to prevent erosion. These soils are rated "Poor to fair" as a source of road fill.

The suitability of a soil for septic-tank drainage fields is based on the field percolation tests. Soils that can absorb 1 inch of water in 60 minutes or less are rated "Good." Soils with a fragipan or claypan underlain by porous material are rated "Marginal." The percolation rates for these soils ranges from less than 60 minutes per inch of water to more than 60 minutes per inch. The variation is caused by the fragipan, which impedes the percolation of water into the porous layer. Once through the fragipan, an inch of water percolates through the porous material in less than 60 minutes. Soils with an impermeable layer, with a high water table, or in which bedrock is close to the surface are rated "Poor" for septic-tank drainage fields. Their percolation rate is in excess of 60 minutes for the absorption of 1 inch of water.

There are many factors involved in the location of airports and highways. For Fairfax County, some of the major soil features considered are: (1) Stability of slopes and embankments; (2) bearing capacity; (3) shrink-swell potential; (4) erodibility; (5) presence of bedrock near the soil surface; (6) stoniness; (7) steep slopes; (8) high water table; (9) flooding; and (10) seepage. Where significant in choosing sites for roads and airports, these soil features are mentioned in the column "Airport and highway location."

Poorly drained soils, especially if they contain much organic matter, are generally unsuited for most types of earth construction. If possible, they should be avoided in building roads. Where these poorly drained soils are excavated and are the only materials readily available for the construction of embankments, proper control measures, such as spreading, disking, and aerating, should be applied to allow soils to dry enough for use in the construction of the embankment. Soils high in silt are very susceptible to frost action and are, therefore, not suitable for use in the upper parts of subgrades and pavement foundations.

Soil features considered in the column, "Footings for single-family dwellings," are: (1) High water table; (2) topographic position (flood plain, terrace, etc.); (3) bearing capacity; (4) shrink-swell potential; (5) stability; and (6) presence of hard rock near the surface. Soils located on flood plains are "Unsuitable" because a Fairfax County ordinance prohibits the construction of homes on flood plains.

The features considered important in the construction of farm pond reservoir areas are: Permeability of the soil, the rate of seepage, and the depth to rock or permeable material (fig. 7). Soils that are rapidly permeable or those that are underlain by permeable rock or soil layers are unsuitable for farm ponds. The features considered in rating soils for farm pond embankments are the permeability, texture, strength, and stability of the soil material. Farm pond embankments in Fairfax County are generally constructed with an inner core of fine-textured, relatively impermeable material, which is covered by an outer shell of coarse-textured material. This type of construction prevents most of the seepage through the embankment and improves the stability of the embankment slopes. The suitability of the soil material for the outer shell or for the inner core is indicated in table 7.

Permeability of a soil is based on the percolation rate of water, in inches per hour, as follows: Very slowly permeable, less than 0.05 of an inch per hour; slowly

permeable, 0.05 to 0.20 of an inch per hour; moderately slowly permeable, 0.20 to 0.80; moderately permeable, 0.80 to 2.50; moderately rapidly permeable, 2.50 to 5.00; rapidly permeable, 5.00 to 10.00; very rapidly permeable, more than 10.00 inches per hour.

Suburban Uses of Soil Survey Information

Suburban development of vacant land in Fairfax County expanded rapidly to keep pace with a population that grew from 40,000 in 1940 to 275,000 in 1960. The County Planning Board, together with many other agencies, requested a detailed soil survey of Fairfax County that could be used for agricultural purposes and for planning urban and suburban development. A soil scientist from the Virginia Agricultural Experiment Station was employed to interpret the soil survey information for agencies and people in the county.

Information gathered in the soil survey is used to locate land that has desirable characteristics for schools, roads, residential areas, agriculture, drainageways, flood plains, industry, and other public and private facilities. Information to guide the solutions to many problems that arise in the making or administrating of master development plans can be obtained from a survey of soils.

About one-fourth of Fairfax County in 1961 is served by a sanitary sewer system. The rest of the county depends on septic tanks and other means of disposing of sewage. Soil survey information is used by the county health department to regulate the placement of septic tanks and to preserve healthful surroundings where res-

Figure 7.—**One of many ponds that have been built for erosion control, recreation, and water supply.**

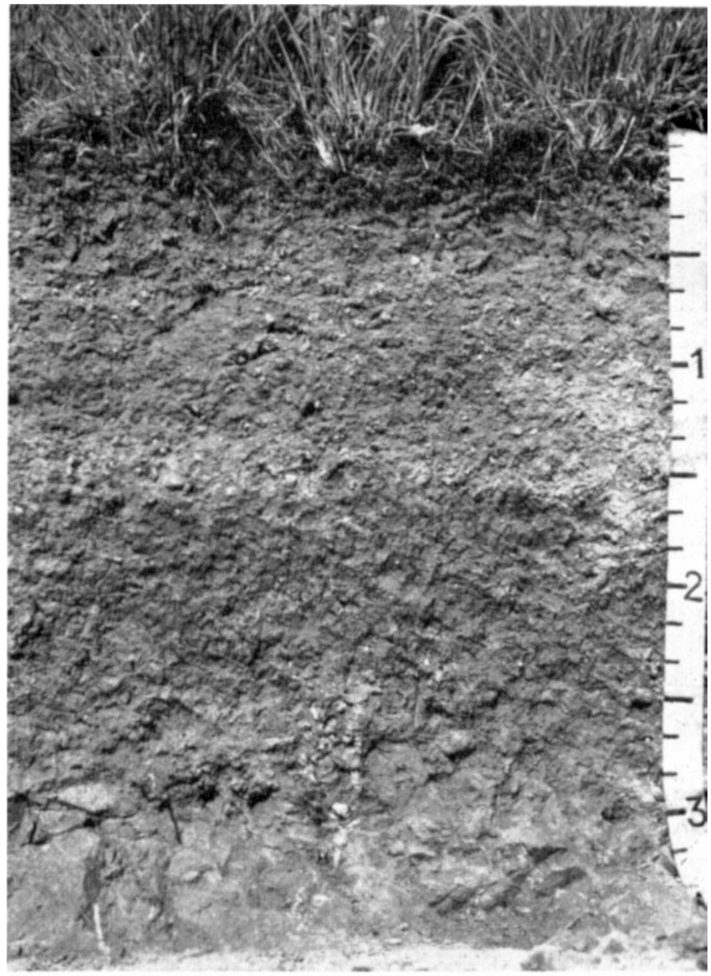

Figure 8.—**Orange silt loam, undulating phase. The dark subsoil opposite numeral 2 is very plastic clay, which is poor for roadbeds, basements, and septic-tank drainage fields.**

idential, commercial, and industrial development is allowed. The ratings of the different soils for septic-tank suitability are given in table 7. Additional information can be obtained in the publication "Use of Soil Survey in Designing Septic Sewage Disposal Systems" (*3*). A percolation test is used to judge individual sites, but the soil map gives warnings about the location of moderately permeable or slowly permeable soils (figs. 8, 9, 10).

Land values in Fairfax County have been greatly affected by the growth in population. Before 1940, excellence for agriculture largely determined land values. At present, the actual or prospective demand of land for residential, commercial, or industrial development influences values. The growth in population requires greatly expanded public facilities and services and, consequently, a larger land-tax base. Soil survey information is used by the tax assessor to make a realistic and equable adjustment of the tax base.

Engineers and numerous county boards, who are responsible for the location and construction of schools, roads, and other public facilities, use the information in soil surveys. Data relative to the water table, flood

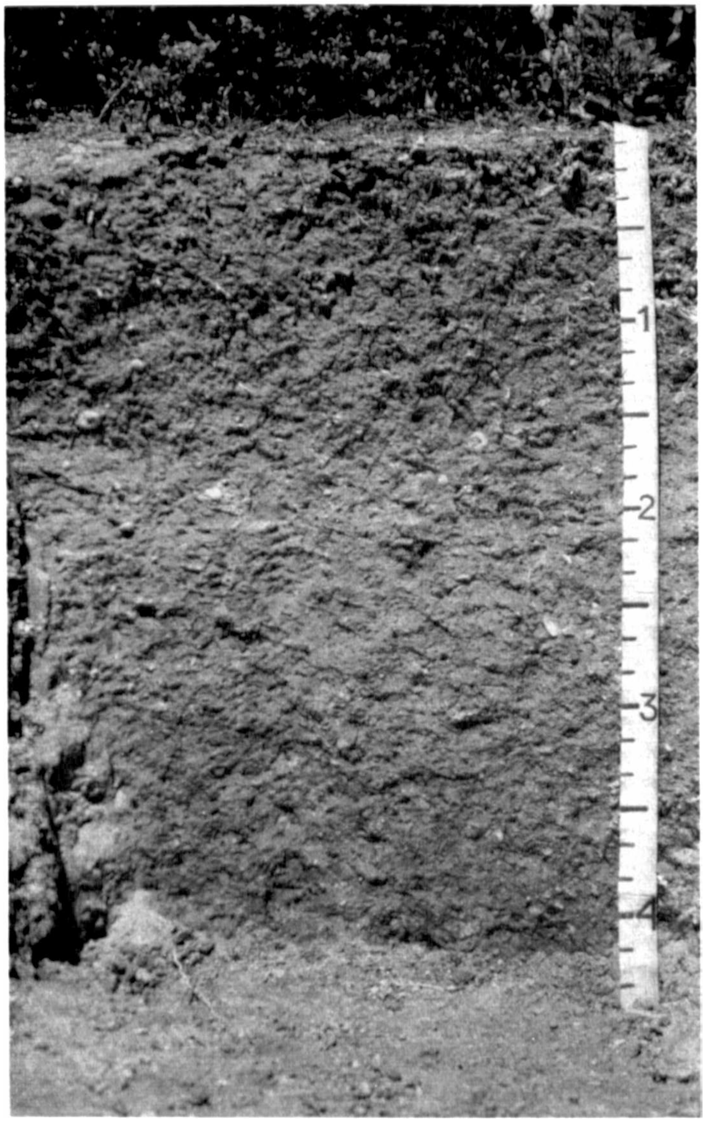

Figure 9.—**Dense clay between numerals 1 and 3 in Beltsville silt loam, undulating phase, is unsuitable for construction that requires good internal soil drainage.**

hazard, soil reaction, depth to hard rock, and other features that limit the suitability of soils for construction are part of this information.

In real estate matters, soil surveys give the prospective buyer of agricultural land a "look under the surface." of the field or farm he wants to buy. Fertility, erosion, drainage, and tillage problems are revealed by the information in the descriptions and interpretations in this report.

Classification and Morphology of the Soils

The system of soil classification now being used in the United States consists of six categories, one above the other. Each successively higher category consists of a smaller total number of classes, and each of these classes has a broader range of characteristics. Thus, there are thousands of classes in the lowest category and no more than three in the highest category. Beginning at the top, the six categories in the system of soil classification are the order, suborder, great soil group, family, series, and type. Of these, only four have been widely used. They are the order, great soil group, series, and type. The categories of the soil order and the great soil group are described briefly in the following paragraphs. The soil series and soil type are defined in the Glossary. The highest category in the present system of soil classification consists of three classes, known as the zonal, intrazonal, and azonal orders.

Zonal soils have characteristics that reflect the influence of the active factors of soil genesis—climate and living organisms. Their profiles have well-differentiated horizons. The soils have formed in materials that have been in place a long time, are intermediate in physical and chemical composition, and are not subject to extremes in drainage or topography.

Intrazonal soils have genetically related horizons, which have developed through the dominant influences of topography or parent material over those of climate and living organisms. Like the zonal soils, these soils have also formed from materials that have been in place

TABLE 8.—*The soil series of Fairfax County classified according to order and great*

Order, great soil group, and soil series	Parent material	Description of average profile not severely eroded
Zonal order:		
Red-Yellow Podzolic soils:		
Appling	Eluvium from granite and gneiss	Light yellowish-brown gritty loam; yellowish-red clay loam at depth of 12 inches; moderate structure, variegated below depth of 32 inches; bedrock 3 to 8 feet below surface.
Elioak	Eluvium from micaceous quartz and sericite schist.	Yellowish-brown silt loam grading to red silty clay loam; moderate structure at depth of 13 inches; bedrock 3 to 50 feet below surface.
Enon [1]	Eluvium from mixed basic and acidic rocks.	Dark yellowish-brown silt loam grading to yellowish-red, plastic clay; moderate structure below depth of 9 inches; bedrock 1½ to 5 feet below surface.
Fairfax	Old general alluvium, sand, silt, and clay.	Brownish-yellow silt loam grading at depth of 10 inches to yellowish-brown silty clay loam with moderate structure; bedrock 10 feet or more below surface.

See footnote at end of table.

a long time. The materials, however, may be extreme in nature, as, for example, very fine textured or highly calcareous. Or the soil may develop where parent materials are not extreme but drainage is restricted by level topography.

The azonal order consists of soils that lack discernible, genetically related horizons because of youth, resistant parent material, or steep topography. Soils in this order may be forming in flood-plain material or other recently deposited sediment, which has been in place for too short a time to allow the differentiation of horizons other than accumulation of some organic material in the surface layer. The lack of genetically related horizons may also be caused by parent materials that are resistant to change, or by the fact that the materials occupy steep slopes where removal through erosion keeps pace with horizon differentiation.

The great soil group is the next lower category beneath the soil order that has been widely used in this country. Classes in that category have been used to a very great extent because they indicate a number of relationships in the soil genesis and also indicate something of the fertility status, adaptability for crops or trees, and the like.

Each great soil group consists of a number of soil series with many internal features in common. Thus, all members of a single great soil group in either the zonal or intrazonal orders have the same number and kind of definitive horizons in their profiles. These definitive horizons need not be expressed in the same degree, nor do they need to be of the same thickness in all soils within one great soil group. Specific horizons must be recognizable, however, in every soil profile of a soil series representing a given great soil group.

Great soil groups in the azonal order are defined in part on the nature of the profile and, also in part, on history or origin of the soil. All members of a single great soil group have a number of internal features in common, but none of the great soil groups in the azonal order has distinct horizonation. Consequently, all azonal soils still bear a strong imprint of the materials from which they are being formed. Definitions of the great soil groups in the azonal order are centered on the portion of the profile approximately comparable in thickness to the solum of associated great soil groups of the zonal and intrazonal orders.

Figure 10.—**Broken shale and siltstone underlie Penn silt loam, eroded undulating phase. This material makes the soil permeable enough for basements and septic-tank drainage fields.**

The classification of the soil series in Fairfax County into great soil groups and orders is given in table 8. Each series recognized in the county has been classified on the basis of the current understanding of the soils and their formation. The present classification is based mainly on soil characteristics that have been observed in the field. Not enough laboratory data are available to aid greatly in the classification into higher categories. The explanation of the morphology of the soils, as related to the great soil groups, is given in the following pages. Additional information about the soils is available in publications of the Virginia Agricultural Experiment Station (*9*) (*16*).

soil group and described according to parent material, texture, color, and other features

Slope and position	Soil drainage	Development in profile
Undulating to hilly; Piedmont Upland	Good	Strong.
Undulating to hilly; Piedmont Upland	Good	Strong.
Undulating to hilly; Piedmont Upland	Moderately good	Strong.
Undulating; Coastal Plain Upland	Good to moderately good	Strong.

TABLE 8.—*The soil series of Fairfax County classified according to order and great*

Order, great soil group, and soil series	Parent material	Description of average profile not severely eroded
Zonal order—Continued		
Red-yellow Podzolic soils—Continued		
Masada	Old alluvium from igneous and related metamorphosed rocks.	Yellowish-brown gravelly loam; predominantly yellowish-red, friable, compact clay loam at depth of 15 inches.
Mayodan	Colluvium from sandstone, shale, and conglomerate.	Light yellowish-brown silt loam grading to strong-brown silty clay loam; moderate structure at depth of 12 inches; bedrock 8 to 90 feet below surface.
Wickham	Moderately old alluvium from igneous and related metamorphosed rocks.	Brown to dark-brown loam; reddish-brown, friable clay loam at depth of 10 inches.
Red-Yellow Podzolic soils intergrading to Reddish-Brown Lateritic soils:		
Lloyd	Eluvium from basic and acidic igneous and related metamorphosed rocks.	Dark-brown loam; red, friable silty clay to clay below depth of 8 inches.
Red-Yellow Podzolic soils with fragipan:		
Calverton	Eluvium and alluvium from red sandstone and shale (Triassic).	Very pale brown silt loam grading at depth of 15 inches to yellowish-brown silty clay loam of strong structure; fragipan at depth of 17 inches; bedrock 2½ to 6 feet below surface.
Gray-Brown Podzolic soils:		
Brecknock	Eluvium from baked shale and shaly sandstone (Triassic).	Very pale brown silt loam; dark grayish-brown silty clay loam having strong structure at depth of 18 inches; bedrock is 3½ to 5 feet below surface.
Matapeake	Unconsolidated acid clay, silt, and sand.	Yellowish-brown silt loam grading at depth of 14 inches to yellowish-red silty clay loam of moderate structure; mottled below depth of 38 inches.
Mattapex	Unconsolidated acid sand, silt, and clay.	Yellowish-brown silt loam; yellowish-brown clay loam at depth of 8 inches; distinctly mottled sandy clay loam of moderate structure below depth of 34 inches.
Gray-Brown Podzolic soils intergrading to Red-Yellow Podzolic soils:		
Birdsboro	Old general alluvium from red sandstone and shale (Triassic).	Yellowish-brown silt loam; yellowish-red silty clay loam at depth of 7 inches; weak structure; mottles at depth of 20 inches; bedrock 2 to 6 feet below surface.
Bucks	Eluvium from reddish shaly sandstone and shale (Triassic).	Brown silt loam; yellowish-red to red silty clay loam at depth of 7 inches; strong structure; bedrock is 3 to 6 feet below surface.
Glenelg	Eluvium from micaceous quartz and sericite schist.	Brown silt loam; yellowish-red silty clay loam with strong structure below depth of 7 inches; bedrock is 16 to 100 feet below surface.
Glenville	Moderately old colluvium and local alluvium from igneous and related metamorphosed rocks.	Yellowish-brown silt loam; mottled, mostly gray silty clay loam below depth of 18 inches.
Lunt	Old alluvium consisting of acid sand, silt, and clay.	Dark-brown fine sandy loam grading to strong-brown, plastic sandy clay; weak structure; sandy loam below depth of 45 inches.
Readington	Eluvium from shaly sandstone (Triassic).	Strong-brown silt loam grading to red, mottled silty clay loam; weak structure; bedrock is 1½ to 4 feet below surface.
Sassafras	Unconsolidated acid sand, silt, and clay	Brown fine sandy loam grading to strong-brown fine sandy clay loam having weak structure at depth of 9 inches; mottled strata at depth of 32 inches.
Woodstown	Unconsolidated acid sand, silt, and clay	Very dark brown grading to yellowish-brown fine sandy loam; yellowish-brown, mottled sandy clay loam below depth of 10 inches; sandier at depth of 38 inches.
Gray-Brown Podzolic soils intergrading to Planosols:		
Beltsville	Unconsolidated sand, silt, and clay	Pale-yellow silt loam over strong-brown, firm silty clay loam; fragipan at a depth of about 20 inches.
Raritan	Moderately old alluvium from shaly sandstone and shale (Triassic).	Dark-brown silt loam; mottled silty clay loam having strong structure below depth of 8 inches; silty clay at depth of 24 inches.
Gray-Brown Podzolic soils intergrading to Lithosols:		
Penn	Eluvium from reddish arkosic sandstone and shale.	Yellowish to reddish-brown silt loam; many coarse fragments below depth of 7 inches; bedrock is 1 to 2½ feet below surface.

See footnote at end of table.

soil group and described according to parent material, texture, color, and other features—Continued

Slope and position	Soil drainage	Development in profile
Undulating to rolling; high stream terraces	Good	Strong.
Gently sloping; Piedmont Lowland	Good to moderately good	Moderate to strong.
Undulating; low stream terraces	Good	Strong.
Undulating; Piedmont Upland	Good	Strong.
Nearly level to gently sloping; upland and colluvial slopes of Piedmont Lowland.	Moderately good to somewhat poor	Strong.
Undulating to rolling; Piedmont Lowland	Good to moderately good	Moderate to strong.
Nearly level to gently undulating; Coastal Plain	Good	Strong.
Nearly level to gently undulating; Coastal Plain Upland	Moderately good	Moderate to strong.
Undulating; stream terraces in Piedmont Lowland	Good to moderately good	Strong.
Undulating; Piedmont Lowland	Good	Moderate to strong.
Undulating to hilly; Piedmont Upland	Good	Moderate to strong.
Gently sloping; concave foot slopes and drainageways; in Piedmont Upland.	Moderately good to somewhat poor	Moderate.
Undulating to hilly; moderately high terraces of the Coastal Plain.	Good	Medium to strong.
Gently undulating; Piedmont Lowland	Good to moderately good	Weak to moderate.
Nearly level to gently rolling; Coastal Plain	Good	Strong.
Nearly level to gently undulating; Coastal Plain Upland	Moderately good	Moderate to strong.
Undulating; old high terraces of the Coastal Plain	Moderately good	Strong.
Undulating; on low stream terraces in the Piedmont Lowland.	Somewhat poor	Moderate to strong.
Undulating to steep; Piedmont Lowland	Good to somewhat excessive	Weak to very weak.

TABLE 8.—*The soil series of Fairfax County classified according to order and great*

Order, great soil group, and soil series	Parent material	Description of average profile not severely eroded
Zonal order—Continued		
Gray-Brown Podzolic soils intergrading to Low-Humic Gley soils:		
Lenoir	Unconsolidated acid sand, silt, and clay.	Light yellowish-brown silt loam grading to gray, plastic clay at depth of 15 inches; sandy loam is at depth of 47 inches.
Reddish-Brown Lateritic soils:		
Hiwassee	Old alluvium from igneous and related metamorphosed rocks.	Reddish-brown silt loam over red clay; bedrock is 10 to 20 feet below surface.
Reddish-Brown Lateritic soils intergrading to Red-Yellow Podzolic soils:		
Montalto	Eluvium from medium-grained syenite and syenitic diabase.	Reddish-brown silt loam grading to red silty clay loam at a depth of about 14 inches; bedrock is 1 to 4 feet below surface.
Reddish-Brown Lateritic soils intergrading to Planosols:		
Mecklenburg	Eluvium from basic rocks, chiefly syenite.	Dark-brown silt loam grading to yellowish-red, plastic clay at depth of 14 inches; moderate structure; bedrock is 1½ to 5 feet below surface.
Sols Bruns Acides:		
Manor	Eluvium from micaceous quartz and sericite schist.	Yellowish-brown, micaceous silt loam; weathered shaly material at depth of 19 inches; bedrock is 14 to 100 feet below surface.
Intrazonal order:		
Low-Humic Gley soils:		
Bowmansville	Young general alluvium from shaly sandstone and shale (Triassic).	Grayish-brown, faintly mottled silt loam; mottled silty clay loam below depth of 10 inches; bedrock is 5 to 10 feet below surface.
Elkton	Unconsolidated acid fine material, chiefly clay.	Gray silt loam; mottled predominantly gray sandy clay below depth of 12 inches.
Wehadkee	Young general alluvium from igneous and related metamorphosed rocks.	Mottled gray and brown silt loam; mottled silty clay loam below depth of 10 inches; stratified at depth of 40 inches.
Worsham	Local alluvium and colluvium from igneous and related metamorphic rocks.	Grayish-brown, mottled silt loam; mottled silty clay loam at depth of 7 inches; silt loam below depth of 36 inches; bedrock is 20 feet below the surface.
Planosols:		
Croton	Eluvium from shaly sandstone, shale, and conglomerate (Triassic).	Faintly mottled silt loam; mottled silty clay grading to plastic clay below depth of 9 inches; bedrock is 2 to 6 feet below surface.
Elbert	Eluvium from diabase and syenite rocks.	Light olive-brown, faintly mottled silt loam grading to strongly mottled plastic clay at a depth of 13 inches; bedrock is 3 to 6 feet below surface.
Iredell	Eluvium from diabase and syenite	Yellowish-brown silt loam; yellowish, plastic clay below depth of 11 inches; mottled sandy loam and disintegrated rock below depth of 29 inches.
Kelly	Eluvium from mixed baked shaly sandstone and diabase (Triassic).	Brownish-yellow silt loam grading to silty clay loam at a depth of about 8 inches; plastic clay argipan is at depth of 18 inches; bedrock is 3 to 6 feet below surface.
Orange	Eluvium from greenstone, serpentine, hornblende, and associated rocks.	Light yellowish-brown silt loam; mottled, friable silty clay loam at a depth of 9 inches; grades abruptly to plastic clay argipan at depth of 23 inches; bedrock is 1½ to 4 feet below surface.
Planosols intergrading to Red-Yellow Podzolic soils:		
Colfax	Eluvium from granite gneiss	Brownish-yellow loam; mottled clay loam at depth of 19 inches; mottled clay loam to clay argipan below depth of 27 inches; bedrock is 4 to 20 feet below surface.
Azonal order:		
Lithosols:		
Bremo	Eluvium from basic rocks, chiefly greenstone.	Brown silt loam; variegated parent material at depth of 6 inches; bedrock is less than 36 inches from the surface.
Catlett	Eluvium from baked sandstone, shale, and conglomerate (Triassic).	Pale-brown gravelly silt loam; weathered shale below depth of 8 inches; bedrock is 1 to 2 feet below surface.
Lithosols intergrading to Red-Yellow Podzolic soils:		
Louisburg	Eluvium from granite gneiss	Grayish-brown to yellowish-brown sandy loam; disintegrated rock at depth of 9 inches; coarse fragments common.
Regosols:		
Galestown	Unconsolidated acid sand	Brown, grading at depth of 8 inches to strong-brown loamy fine sand.

See footnote at end of table.

soil group and described according to parent material, texture, color, and other features—Continued

Slope and position	Soil drainage	Development in profile
Nearly level; lower terraces of the Coastal Plain	Somewhat poor	Moderate.
Undulating; on moderately high stream terraces	Good	Strong.
Undulating to hilly; Piedmont Lowland	Good	Strong.
Undulating to rolling; Piedmont Lowland	Good to moderately good	Strong.
Rolling to steep; Piedmont Upland	Good	Weak.
Nearly level; low areas in first bottom of the Piedmont Lowland.	Poor	Weak.
Nearly level; lower terraces of the Coastal Plain	Poor	Moderate.
Nearly level; low areas in first bottoms of the Piedmont Lowland.	Poor	Weak.
Level to gently sloping; low, flat areas and colluvial slopes in Piedmont Upland.	Poor	Moderate.
Level to gently undulating; Piedmont Upland	Poor	Moderate.
Level to very gently rolling; Piedmont Lowland	Poor	Moderate.
Nearly level to gently undulating; Piedmont Lowland	Moderately good to somewhat poor	Strong.
Undulating; low parts of Piedmont Lowland	Moderately good to somewhat poor	Strong.
Nearly level to undulating; flats of the Piedmont Upland	Moderately good	Strong.
Undulating; heads of drainageways, footslopes, and upland flats of Piedmont Upland.	Somewhat poor	Strong.
Rolling; Piedmont Upland	Somewhat excessive	Very weak.
Undulating to steep; Piedmont Lowland	Somewhat excessive	Very weak.
Rolling to steep; Piedmont Upland	Somewhat excessive	Weak to moderate.
Nearly level to gently undulating; lower Coastal Plain	Excessive	Weak to very weak.

TABLE 8.—*The soil series of Fairfax County classified according to order and great*

Order, great soil group, and soil series	Parent material	Description of average profile not severely eroded
Azonal order—Continued		
Alluvial soils:		
Bermudian	Young general alluvium from shaly sandstone and shale (Triassic).	Reddish-brown silt loam; moderate structure in 22- to 37-inch layer.
Chewacla	Young general alluvium from igneous and related metamorphosed rocks.	Dark-brown silt loam; mottled silt loam with moderate structure at depth below 14 inches.
Huntington	Young general alluvium, chiefly from limestone.	Dark-brown silt loam grading to silty clay loam; faint mottles below depth of 5 feet.
Lindside	Young general alluvium, chiefly from limestone.	Dark-brown silt loam; at 10 inches silty clay loam distinctly mottled below depth of 23 inches.
Manassas	Local alluvium and colluvium from reddish shaly sandstone and shale (Triassic).	Reddish-brown silt loam; weak structure; silty clay loam in 12- to 27-inch layer; faint mottles below depth of 27 inches.
Meadowville	Local alluvium and colluvium from micaceous quartz and sericite schist.	Brown silt loam; moderate structure; silty clay loam in 14- to 45-inch layer; mottled below depth of 45 inches.
Rowland	Young general alluvium from shaly sandstone and shale (Triassic).	Reddish-brown silt loam; mottled silty clay loam with weak structure below depth of 10 inches.

[1] Further studies since field mapping was completed have shown that these soils have a number of characteristics of the Fluvanna soils.

Zonal Order

In Fairfax County the zonal order is represented by the Red-Yellow Podzolic, Gray-Brown Podzolic, Reddish-Brown Lateritic soils, Sols Bruns Acides, and the intergrades of soils in these groups to other great soil groups. A discussion of these great soil groups and the soil series in each follows.

Red-Yellow Podzolic soils

Red-Yellow Podzolic soils are a group of well-developed, well-drained, acid soils that have thin organic (A_0) and organic-mineral (A_1) horizons over a light-colored, bleached (A_2) horizon, over a red, yellowish-red or yellow, more clayey (B) horizon. The parent materials are all more or less siliceous. Where the parent materials are thick, coarse reticulate streaks or mottles of red, yellow, brown, and light gray are characteristic of the deep horizons in Red-Yellow Podzolic soils. In Fairfax County most of the well-developed soils of uplands and terraces have characteristics of the Red-Yellow Podzolic soils. These soils are mostly undulating and rolling, have the best natural drainage of any of the mature soils of uplands, and, for the most part, occupy ridgetops. Although they vary in age, all are old enough to have at least moderately well developed Red-Yellow Podzolic profiles.

Red-Yellow Podzolic soils have developed under deciduous, coniferous, or mixed forests in warm-temperate to tropical humid climates. In cultivated areas the A_0 and A_1 horizons are in the plow layer. In many places, accelerated erosion has removed all or nearly all of the A horizon and exposed the B horizon. The clay fraction is dominated by kaolinite, but it contains considerable free ferric oxide or hydroxide and, in places, a fairly small percentage of aluminum hydroxide.

Hydrous mica and montmorillonite dilute the clay fraction in some of the Red-Yellow Podzolic soils but are not considered to be typical components. In any specific parent material, reticulate streaks generally are higher in profiles that have yellow B horizons than in those with red B horizons. In a few members of the group, especially the very sandy ones, the streaked material may be absent. Other well-developed, well-drained, red and yellow soils, without podzolic morphology, are associated with Red-Yellow Podzolic soils.

Red-Yellow Podzolic soils were classified separately as Red Podzolic and Yellow Podzolic soils in the publication "Soils and Men" (*13*). Marbut called them Red and Yellow soils (*8*).

The Red-Yellow Podzolic soils are low in bases, particularly calcium and magnesium. All are low in phosphorus and are strongly to extremely acid in reaction. Because of fairly high prevailing temperature and rainfall, the decomposition of organic matter and the leaching of plant nutrients, colloidal material, and organic matter are fairly rapid. Fairfax County is in the northern part of the area in the United States in which the zonal soils are largely represented by the Gray-Brown Podzolic great soil group. It probably could be shown chemically that the soils of this group in this county are less leached and eluviated (podzolized), and that the prepodzolization process of laterization is less evident, than in the same soils occurring farther south.

The Elioak, Appling, Enon, Mayodan, Fairfax, Masada, and Wickham are Red-Yellow Podzolic soils.

ELIOAK SERIES

Soils of the Elioak series represent the central concept of the Red-Yellow Podzolic great soil group. The subsoil is in the redder part of the range for the group. The Elioak soils have formed chiefly from the weathered products of quartz sericite schist. The Elioak soils are associated with the Glenelg, Manor, Glenville, and Worsham soils. They are on ridgetops and on a few ridge slopes where drainage is good to somewhat excessive and where relief is mostly undulating and rolling. Small angular fragments and cobbles of quartz are common on and in some of the upper soil horizons. In places erosion has removed the A horizon and exposed the red silty clay loam subsoil.

Profile of Elioak silt loam, undulating phase (in woodland having a slope of about 3 percent, located about ½ mile east of Dranesville, just west of State Highway No. 717):

soil group and described according to parent material, texture, color, and other features—Continued

Slope and position	Soil drainage	Development in profile
Nearly level; first bottoms in Piedmont Lowland	Good	Weak.
Nearly level; first bottoms in Piedmont Lowland	Moderately good to somewhat poor	Weak.
Nearly level; first bottoms along Potomac River	Good	Weak.
Nearly level; first bottoms along Potomac River	Moderately good to somewhat poor	Weak.
Very gently sloping to sloping; depressions at heads of and along upland drainageways.	Good to moderately good	Weak.
Very gently sloping to sloping; depressions at heads of and along upland drainageways.	Good to moderately good	Weak.
Nearly level; first bottoms in Piedmont Lowland	Moderately good to somewhat poor	Weak.

A_0 1 inch to 0, dark reddish-brown (5YR 3/2),[2] partly decomposed forest leaf and litter mold.

A_2 0 to 6 inches, yellowish-brown (10YR 5/4), friable silt loam; weak, fine, granular structure; roots and root holes numerous; slight mixing of dark reddish-brown hues from the layer above.

A_3 6 to 9 inches, strong-brown (7.5YR 5/6), friable silt loam; very weak, fine, subangular blocky structure; many small pore spaces; roots numerous.

B_{21} 9 to 12 inches, yellowish-red (5YR 5/6), friable silty clay loam; moderate, medium to fine, subangular blocky structure; few small roots.

B_{22} 12 to 35 inches, red (2.5YR 4/6), friable, light silty clay loam; moderate, medium, subangular blocky structure; small flakes of mica numerous.

C_1 35 to 50 inches, mottled red (2.5YR 4/8), reddish-yellow (7.5YR 7/8), and yellow (10YR 7/6), very friable, micaceous silty clay loam; very weak, fine, subangular blocky structure; many soft fragments of weathered schist intermixed; some moderately hard, finely laminated, light reddish-brown fragments of schist; mica prominent throughout layer.

C_2 50 to 55 inches, reddish-yellow (5YR 6/6), very friable, soft, micaceous silt or silty clay soil material; approximately half of layer consists of moderately hard, finely laminated schist, which is reddish yellow on outside and dark reddish brown on inside.

The soil is strongly acid throughout the profile; roots penetrate the entire solum.

Appling Series

In color profile the Appling soils are intermediate between the "red" and "yellow" members of the Red-Yellow Podzolic great soil group. They are deep, well drained to somewhat excessively drained, and predominantly undulating to rolling. They have formed in the residuum of granite gneiss. The surface layer and C horizon have a coarser texture than corresponding horizons in the Glenelg soils and a finer texture and more development than those in the associated Louisburg soils.

Profile of Appling gritty loam, undulating phase (in a cultivated field having a slope of about 10 percent, located ½ mile south of State Highway No. 123, 3 miles northwest of Occoquan, Va.):

A_1 0 to 1 inch, dark-gray (10YR 4/1), very friable loam; weak, fine, granular structure; many grass roots; range in thickness is from ¼ inch to 1 inch.

A_2 1 to 7 inches, light yellowish-brown (2.5Y 6/4), very friable, coarse loam; weak, fine, granular structure; 5 to 10 percent of mass is small angular particles of quartz; many roots.

B_1 7 to 12 inches, reddish-yellow (7.5YR 6/6), and strong-brown (7.5YR 5/6), friable, light silt loam to heavy fine sandy clay loam; moderate, fine to medium, subangular blocky structure; grit-size quartz common; some mixing of darker soil from horizon above is evident along root channels and on soil peds.

B_2 12 to 20 inches, yellowish-red (5YR 5/6) clay loam; layer faintly mottled by clay skins of reddish yellow (7.5YR 6/6) and strong brown (7.5YR 5/6); moderate, fine to medium, subangular blocky structure; many small quartz pebbles; tree roots common.

B_3 20 to 32 inches, yellowish-red (5YR 5/6), strong-brown (7.5YR 5/6), reddish-yellow (7.5YR 6/6), and red (10R 4/6), friable, gritty sandy clay loam or light clay loam; weak, medium, angular blocky structure.

C_1 32 to 40 inches, mottled yellowish-red, strong-brown, brownish-yellow, and reddish-yellow, very friable sandy clay loam soil material; structure similar to that of the gneiss rock material; many clay films of brown and strong brown; many flakes of mica and pebbles of quartz.

C_2 40 to 50 inches, distinctly mottled yellowish-red, strong-brown, red, brownish-yellow, and reddish-yellow, gritty sandy loam soil material; structure similar to that of the unweathered rock material.

Enon Series

The Enon series consists of moderately deep, well drained to moderately well drained soils that have developed from mixed basic and acidic rocks. The soils have a sticky, plastic B horizon that is finer textured than that in the Appling soils. They are less acid throughout than the Appling soils. The A horizon of the Enon soils is mostly dark yellowish-brown to yellowish-brown, very friable silt loam. In most places, the upper B horizon is strong-brown silty clay loam, and the main B horizon is strong-brown to yellowish-red, plastic, blocky silty clay to clay. The parent material is mingled reddish-yellow, strong-brown, yellow, brownish-yellow, pale-brown, and light-gray silty clay loam to silt loam mixed with quartz gravel and partly weathered fragments of basic and acidic rocks.

[2] Symbols in parentheses are Munsell coordinates (hue, value, and chroma) of the colors observed.

The Enon soils are associated with the Orange, Bremo, and Lloyd soils. The parent rock is similar to that of the Lloyd soils. Drainage, position, color, and texture are intermediate between that of the Lloyd and Orange soils. Like the Lloyd soils, the Enon occupies narrow places between areas of acidic and basic rocks. They are about like the Appling soils in color of the profile except that the surface layer is a little browner.

Because the Enon soils have formed from mixed basic and acidic rock materials and occupy positions transitional between basic and acidic soil areas, they are usually more variable than soils that have formed from uniform rock materials. Further studies since field mapping was completed have shown that these soils have a number of characteristics of the Fluvanna series.

Mayodan Series

The Mayodan soils have developed from products that weathered from sandstone and conglomerate (Triassic) and from fluvial mantle material that had weathered from similar rocks. The Mayodan soils are well drained to moderately well drained. The terrain is predominantly undulating. Most of the acreage is near the eastern border of the Piedmont Lowland. The fluvial mantle is underlain at a shallow depth by an old land surface consisting of the residuum from schist that presents a buried profile resembling that of the present-day Elioak and Glenelg soils.

In drainage and color of the profile, the Mayodan soils are intermediate between the Bucks and the Calverton soils. Natural drainage is similar to that of the Fairfax soils. Thin, compacted layers have developed in places in the Mayodan soils where the mantle, or overlay, materials are in contact with the underlying land surface. The Mayodan soils have a light yellowish-brown, friable, silt loam A_2 horizon and a yellowish-brown, friable, heavy silt loam B_1 horizon. The B_2 horizon is mostly strong-brown to yellowish-red, friable, slightly sticky silty clay loam to heavy silty clay loam that has a moderate, fine, subangular blocky structure. Below a depth of 32 to 36 inches, the soil is generally mottled strong brown, yellowish red, and brownish yellow in places and contains many rounded and subangular pebbles of quartz and many partly weathered fragments of shale, sandstone, and some schist.

Fairfax Series

The Fairfax soils have formed from mantle material in old fluvial deposits on the higher terraces of the Coastal Plain. They have a yellowish-brown to light yellowish-brown loam and silt loam A_2 horizon; a strong-brown and yellowish-brown silty clay loam upper B horizon; and a mottled yellowish-brown, brownish-yellow, yellow, yellowish-red, and light-gray, slightly compact silty clay loam lower B horizon (fig. 11).

The buried profiles of the old land surface resemble those of the Appling, Glenelg, and Elioak soils. The mantle of fluvial material in which the Fairfax soils have formed is from 6 inches to several feet thick, but in most places it is about 26 to 36 inches thick. The entire profile is in the overlay material in most places. The Fairfax soils are associated with the Appling, Elioak, Glenelg, Beltsville, Manor, and Louisburg soils. They lack the fragipan of the Beltsville soils but do have a weakly developed compact layer, or immature fragipan. In many places the main part of the B layer in Fairfax soils is lighter colored than the B horizon in the better drained Appling and Glenelg soils.

Masada Series

Soils of the Masada series have developed on old stream terraces consisting of material that originated from granite and associated rocks of the Piedmont Upland. The Masada soils are well drained to moderately well drained. The profile resembles that of the Appling in color, texture, structure, and degree of development. Pebbles are common. A moderately developed fragipan occurs in places.

Wickham Series

The Wickham soils, which were mapped with the Hiwassee soils as an undifferentiated mapping unit, are on low stream terraces consisting of material that washed from the Piedmont Upland. The surface soil is browner and the subsoil is darker red than that of the Masada soils.

Red-Yellow Podzolic soils intergrading to Reddish-Brown Lateritic soils

The Lloyd soils have been classified as Red-Yellow Podzolic soils grading to the Reddish-Brown Lateritic soils. The parent material is a mixture of basic and acidic rocks, mainly schist and greenstone, of the Piedmont Upland. Most areas are in positions transitional between the Glenelg and Elioak soils, which have formed from rocks that were high in mica and silica, and the Orange and Enon soils, which have formed from rocks that contained less mica and silica. In color characteristics, the Lloyd soils resemble the Hiwassee soils of the terraces.

Red-Yellow Podzolic soils with fragipan

The Calverton soils are in this group. The parent material is mottled gray, light reddish-brown, red, reddish-yellow, friable loam to silt loam mixed with many partly decomposed pieces of red shale or sandstone. The Calverton soils resemble the Beltsville soils in color and relief. They are associated with the Bucks, Penn, Readington, and Croton soils. In cultivated areas, the Calverton soils have a brownish-yellow silt loam A horizon and a yellowish-brown to strong-brown silty clay loam and clay loam upper B horizon. They have a weakly to strongly developed, mottled strong-brown to reddish-yellow and gray clay loam to silty clay fragipan. The fragipan is less strongly developed in the silt loam type.

Gray-Brown Podzolic soils

Gray-Brown Podzolic soils have comparatively thin organic coverings and organic-mineral layers over a grayish-brown, leached A horizon that rests upon an illuvial B horizon. They have developed under deciduous forests in a temperate, moist climate. They have a surface covering of leaf litter, usually from deciduous trees; a dark, thin, slightly or moderately acid humus, somewhat mixed with mineral soil; a grayish-brown, granular, loamy A_1 horizon and a light brownish-gray or light yellowish-brown A_2 horizon; a moderately heavy, subangular blocky, yellowish-brown, brown, brownish-yel-

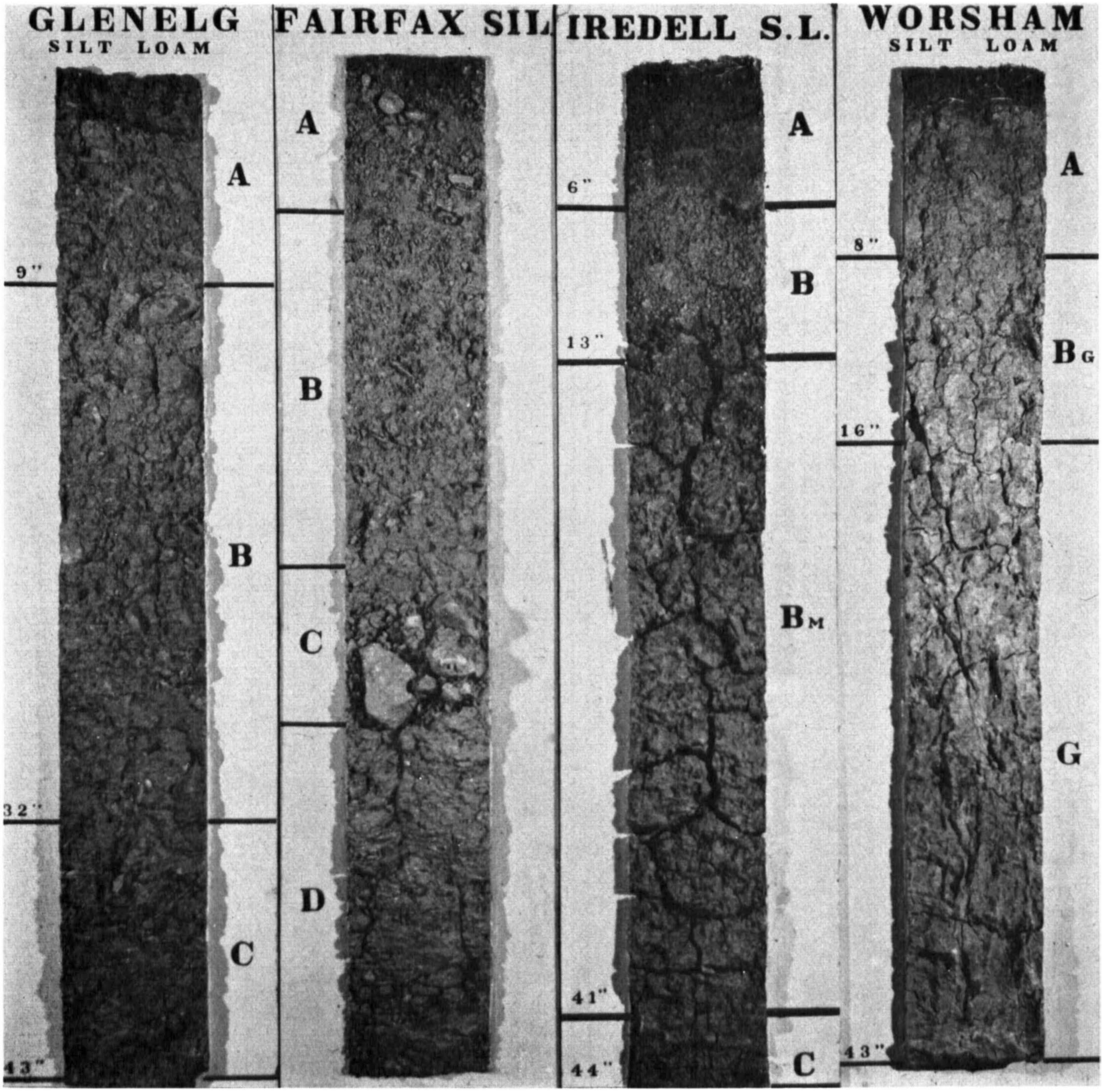

Figure 11.—**The major horizons of four soils.**

low, or reddish-brown B horizon that is lighter colored with depth. The total thickness of the solum varies considerably but seldom exceeds 4 feet. Podzolization is the main process in the development of these soils (*6*, *8*). The Matapeake, Brecknock, and Mattapex soils are in this great soil group.

Matapeake Series

The Matapeake soils represent the central concept of the Gray-Brown Podzolic great soil group in Fairfax County. The surface layer is darker and the subsoil has less chroma than the corresponding layer in soils within the central concept of the Red-Yellow Podzolic great soil

group. However, there is no notable difference in degree of acidity, and data are not available to indicate that there is an appreciable difference in degree of base saturation.

Profile of Matapeake silt loam under a forest cover:

A_0 ½ inch to 0, dark reddish-brown (5YR 2/2) forest litter; mostly partly decomposed roots and twigs of oak, pine, and running cedar.

A_1 0 to 2 inches, dark-brown (10YR 4/3) to very dark yellowish-brown (10YR 4/4), friable, light silt loam; moderate, medium to fine, granular structure; many small roots.

A_2 2 to 8 inches, yellowish-brown (10YR 5/4) to dark yellowish-brown (10YR 4/4), very friable silt loam; weak, fine, granular structure; many roots.

B_1 8 to 14 inches, strong-brown (7.5YR 5/6), heavy silt loam or silty clay loam; moderate, medium, subangular blocky structure; few roots; small black specks of mineral.

B_{21} 14 to 22 inches, strong-brown (7.5YR 5/6) to yellowish-red (5YR 5/6), friable, slightly plastic silty clay loam; weak to moderate, medium, subangular blocky structure; few black mineral specks; coatings on cleavage planes of soil peds not so black as mineral specks.

B_{22} 22 to 38 inches, dominantly strong-brown (7.5YR 5/6) very fine sandy clay loam to light clay loam; faint splotches of yellowish red (5YR 5/6) and light brown (7.5YR 6/4) in lower part; moderate, medium to coarse, subangular blocky structure; many black mineral films and black concretions.

B_3 38 to 44 inches, dominantly strong-brown (7.5YR 5/6) fine sandy clay loam streaked and mottled with pale brown and light brown (7.5YR 6/4); very weak, medium, platy structure crushes easily to weak, fine, angular blocky; friable, slightly compact.

C_1 44 to 52 inches, dominantly strong-brown (7.5YR 5/6) fine sandy loam; slightly compact; common, distinct, medium mottles of yellowish red, pale brown, and light brown.

Brecknock Series

The Brecknock soils have formed from products that weathered from baked shale and sandstone. These soils occupy undulating and rolling uplands. The grayish color of the baked parent material is reflected in the color of the solum. The A horizon is grayish-brown or very pale brown silt loam to loam. The upper part of the B horizon is pale brown and grades to very dark grayish brown with mottles of weak red and strong brown. The B horizon is silty clay loam that has strong, subangular blocky structure. The C horizon consists of partly weathered gray, brown, and grayish-brown baked Triassic shale and sandstone. Pebbles and small angular cobbles are common throughout the soil in most places.

Mattapex Series

The Mattapex soils have formed in unconsolidated marine sand, silt, and clay on terraces of the lower Coastal Plain. These soils have a yellowish-brown silt loam and very fine sandy loam A_2 horizon. The upper subsoil is predominantly yellowish-brown, heavy sandy clay loam or clay loam that is faintly mottled in the lower part with pale brown, strong brown, and light gray. The lower subsoil is distinctly mottled light-gray, pale-yellow, and yellowish-brown, slightly plastic sandy clay loam to clay loam. Many areas in this county have fine-textured substrata. The Mattapex soils are moderately well drained. Slopes are generally not more than 3 percent. The Mattapex soils are associated with the well-drained Matapeake soils and differ from them in being less brown in the upper solum and mottled below a depth of 24 inches. The Mattapex soils differ from the Woodstown in being finer textured throughout. A few areas of Mattapex soils have strata of sand or loamy sand.

Gray-Brown Podzolic soils intergrading to Red-Yellow Podzolic soils

Soils of the Glenelg, Bucks, Readington, Sassafras, Birdsboro, Glenville, Lunt, and Woodstown series are classified as intergrades in these groups.

Glenelg Series

The Glenelg series consists of well-drained, brown soils on undulating to rolling upland. (See fig. 11.) The parent rock was fine-grained, micaceous schist. The Glenelg soils are associated with the Elioak, Manor, and Glenville soils. Compared with the Appling soils, they have a browner solum and are in a thicker regolith. A few areas have a lighter-than-normal solum, and these soils represent an intergrade toward the Red-Yellow Podzolic profile. Glenelg soils are strongly acid and are notably high in potassium.

Profile of Glenelg silt loam, undulating phase (in a wooded area located ¼ mile east of Dranesville, Va., along State Highway No. 7):

A_0 2 inches to 0, dark reddish-brown (5YR 2/2), well-decomposed, matted small roots and leaf litter.

A_1 0 to 2 inches, dark-brown (7.5YR 4/2), friable silt loam; weak, fine, granular structure; many roots.

A_2 2 to 7 inches, yellowish-brown (10YR 5/4), friable silt loam; weak, fine, granular structure; numerous small roots.

B_1 7 to 13 inches, strong-brown (7.5YR 5/6), friable silty clay loam; moderate, fine to medium, subangular blocky structure; few, faint, medium mottles of light brown and yellowish red.

B_2 13 to 22 inches, yellowish-red (5YR 5/6), friable silty clay loam; moderate, fine, subangular blocky structure; mica flakes common; roots numerous; few small angular fragments of quartz and small fragments of schist.

B_3 22 to 28 inches, yellowish-red (5YR 5/6), very friable, micaceous, light silty clay loam; weak, fine to very fine, subangular blocky structure; small roots common.

C 28 to 72 inches, mottled light reddish-brown (5YR 6/4), light-gray, gray, pink, and yellowish-red, soft, micaceous, silty clay schist soil material; no definite structure; some of the freshly weathered schist has fine, laminated rock structure.

Bucks Series

The Bucks series consists of well-drained, deep to moderately deep, strongly developed, undulating soils of uplands.

The soils have formed from the weathered products of red shale, sandstone, and sandstone conglomerate. They are associated with the Penn, Calverton, Readington, and Croton soils of the Piedmont Lowland (Triassic). The general purplish-red to reddish-brown color of the Bucks soils is inherited from the purplish-red and reddish-brown parent rock. In most places, the A horizon is reddish-brown or brown, very friable loam and silt loam. The B_2 horizon is reddish-brown or red, friable sandy clay loam in the loam type, and friable to firm silty clay to clay in the silt loam type. The underlying material is mingled dark-red, dark reddish-brown, reddish-yellow, and brownish-yellow, friable loam to silt loam soil material mixed with much red, dark-red, and

reddish-yellow shale, sandstone, and sandstone conglomerate rock material. Profiles are usually deeper and better developed where the soil is over sandstone conglomerate. The Bucks soils generally are strongly acid throughout; the coarser textured profiles of these soils are slightly more acid and lighter in color than the finer textured ones. The Bucks soils differ from Penn in having a smoother surface and greater thickness and stronger development of horizons.

Readington Series

The Readington soils are associated with the Penn, Bucks, Calverton, and Croton soils. They have formed from similar parent rocks, chiefly shale and shaly sandstone. As mapped in Fairfax County, the Readington soils are intermediate between the Penn and the Calverton soils in development and drainage. They are less well drained than the Penn soils, but they are browner and lack the fragipan of the Calverton soils. The thicker profiles of the Readington soils resemble those of the Bucks soils. Some areas have an A_2 horizon that is lighter colored than that of the Penn and Bucks soils. All of the A_2 horizon is darker than that of the Calverton soils. The average A_2 horizon is yellowish-brown to strong-brown silt loam. The B_2 horizon is 4 to 8 inches thick and is yellowish-red and red, friable silty clay loam that has a weak, fine to medium, subangular blocky structure. The lower part of this horizon is faintly mottled and grades into the C horizon. The parent-material horizon is predominantly red, mottled with light-brown, strong-brown, and pinkish-gray, firm, heavy loam to silty clay loam. The parent material contains many weak-red and red shaly and shaly sandstone fragments. The Readington soils are strongly acid throughout. Except in a few places, slopes are more than 4 percent.

Sassafras Series

The Sassafras soils have formed from sand, silt, and clay of the lower Coastal Plain. They are coarser textured than the Matapeake. The surface layer of the Sassafras soils is brown to dark-brown fine sandy loam; the subsoil is strong-brown to yellowish-red sandy loam and light fine sandy clay loam. The entire profile and underlying strata are more sandy than those of the Matapeake. The Sassafras soils are strongly acid throughout.

Birdsboro Series

The Birdsboro series consists of deep, well drained to moderately well drained soils that have formed in old alluvial material that has washed from soils of the Piedmont Lowland.

The Birdsboro soils differ from the Appling in having a somewhat redder subsoil and in having been formed in old alluvium rather than in residuum. They differ from the Bucks in having a lighter red, more plastic, compact lower subsoil. The A_2 horizon in the Birdsboro soils is mostly yellowish-brown silt loam. The B_2 is mostly yellowish-red, friable, heavy silty clay loam. This layer contains some rounded black concretions, is faintly mottled, is slightly compacted, and in places contains an immature fragipan in the lower part.

Glenville Series

The Glenville series consists of moderately well drained to somewhat poorly drained, nearly level soils in the heads of drainageways. The surface layer is not light enough in color and the subsoil not high enough in chroma to classify this series in the Red-Yellow Podzolic group. Flakes of mica are abundant in the lower layers of the profile. The less well-drained areas of the Glenville soils grade toward the Low-Humic Gley soils.

Lunt Series

The Lunt soils have developed from unconsolidated sand, silt, and clay of the moderately high terraces of the Coastal Plain. The surface layer is dark-brown, friable fine sandy loam; the subsoil is strong-brown, sticky fine sandy clay loam to very sticky sandy clay. The Lunt soils are finer textured and browner than the Sassafras soils. Loose gravel on the surface is characteristic of many areas. The underlying strata vary from sandy clay loam to plastic clay.

Gray-Brown Podzolic soils intergrading to Planosols

In this group are soils of the Beltsville and the Raritan series.

Beltsville Series

The Beltsville series consists of moderately well drained to somewhat poorly drained soils on high terraces of the Coastal Plain. The soils have a moderately well developed to well developed, brownish-yellow to yellowish-brown B horizon that is underlain by a fragipan at about 20 inches from the surface. The fragipan is mottled and has a weak to moderate, medium, platy structure. It is at the base of the fluvial mantle, and immediately above the pan are small pebbles of quartz.

Profile of Beltsville silt loam:

A_p 0 to 8 inches, brown (10YR 5/3), friable loam; few, fine, faint mottles of dark grayish brown (10YR 4/2); weak, fine, granular structure; small roots numerous.

A_3 8 to 11 inches, light yellowish-brown (10YR 6/4), friable, heavy loam; common, fine, faint mottles of yellowish brown (10YR 5/4); weak, fine, subangular blocky structure; many small roots.

B_{21} 11 to 16 inches, yellowish-brown (10YR 5/6), friable silty clay loam; few, faint mottles of light yellowish brown; moderate, fine, subangular blocky structure.

B_{22} 16 to 19 inches, mottled yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3), friable silty clay loam; mottles common, medium, and distinct; weak, fine, subangular blocky structure.

B_{m1} 19 to 27 inches, distinctly mottled strong-brown (7.5YR 5/6) and light-gray (10YR 7/2), extremely hard to indurated, brittle loam; moderate, coarse, angular blocky structure crushes easily into a friable mass; some evidence of platy structure; strong-brown hues prevalent on the faces of broken peds; a few partly rounded and angular quartzite pebbles.

B_{m2} 27 to 56 inches, strong-brown (7.5YR 5/6), faintly mottled with yellowish-brown (10YR 5/6), light fine sandy clay loam; extremely hard, brittle; moderate, medium, angular blocky to weak, thick, platy structure crushes to fine, granular mass; few, small semi-rounded fragments of quartzite.

C_1 56 to 74 inches, yellowish-brown (10YR 5/8), very friable, light fine sandy clay loam; faint mottles of strong brown and brownish yellow; weak, fine, subangular blocky structure.

C_2 74 to 82 inches, distinctly mottled strong-brown, light brownish-gray, and very pale brown, very friable fine sandy loam; mottles are common and medium; very weak, fine, subangular blocky structure to massive.

RARITAN SERIES

The Raritan series consists of somewhat poorly drained soils on low stream terraces. The parent material was derived from Triassic sandstone and shale with a small part from basic rocks. The upper part of the solum in Raritan soils is like a typical Gray-Brown Podzolic profile, but the lower part is gleyed. The A horizon is chiefly dark grayish-brown silt loam about 8 inches thick. The B_2 is thin and consists of yellowish-brown silty clay loam that has a moderate to strong, medium, angular blocky structure. Below a depth of about 11 inches, the material is heavily mottled, firm silty clay loam that has a moderate, medium to coarse, angular blocky structure. Many places at this depth have a compact, weakly developed fragipan.

Gray-Brown Podzolic soils intergrading to Lithosols

The Penn soils are an intergrade between Gray-Brown Podzolic soils and Lithosols. Most of the Penn soils in Fairfax County have a weakly developed profile. The 6- to 7-inch surface layer is pale-brown loam or fine sandy loam. The 7- to 14-inch layer in most areas is a mixture of silt loam to sandy loam and partly disintegrated reddish shale. The soil has a reddish cast, indicative of the reddish parent rock. Slopes are as much as 25 percent, but in much of the acreage the Penn soils, unlike many Lithosols, have slopes of less than 7 percent. Soil drainage is somewhat less excessive than that of the Catlett, Bremo, and Louisburg soils. The Penn soils are the less developed associate of the Bucks soils.

Gray-Brown Podzolic soils intergrading to Low-Humic Gley soils

The Lenoir series has been classified as an intergrade. These soils have developed from unconsolidated marine clay on nearly level terraces on the lower Coastal Plain. The A_2 horizon is prominent, and the B_2 has moderate to strong structural development. Below a depth of 15 inches, the material is strongly gleyed. Strata of sand are at a depth of several feet. The Lenoir soils are associated with the Elkton soils.

Profile of Lenoir silt loam in a cutover, wooded area:

A_{00} and A_0 ¼ inch to 0, very dark grayish-brown (10YR 3/2), partly decomposed forest litter, mostly oak leaves and twigs; many small roots.

A_1 0 to 1 inch, light brownish-gray (2.5Y 6/2) to light olive-brown (2.5Y 5/4), friable silt loam; weak, very fine, granular structure; many tree roots; few red worms.

A_2 1 to 6 inches, light yellowish-brown (10YR 6/4), friable silt loam; weak, very fine, granular structure; many roots; gradual boundary.

B_{21} 6 to 15 inches, predominantly pale-yellow (2.5Y 7/4), firm silty clay; many faint mottles of light gray (2.5Y 7/2); moderate to strong, coarse, subangular blocky structure; mottles most prominent in lower part of horizon.

B_{22} 15 to 40 inches, gray (10YR 5/1), plastic clay; many, coarse mottles of brownish yellow (10YR 6/6) and white (10YR 8/2); strong, coarse, angular blocky structure; brownish-yellow mottles more abundant in the lower part of horizon.

B_3 40 to 47 inches, light-gray (2.5Y 7/2) to white (2.5Y 8/2), heavy clay loam mottled with brownish yellow (10YR 6/6); many skins and streaks of gray (10YR 5/1) along root channels; gradual boundary.

C 47 to 67 inches, light-gray (2.5Y 7/2), mottled with brownish-yellow (10YR 6/6), fine sandy loam; interspersed strata of sandy clay loam soil material; many thin clay skins of gray (10YR 5/1) on soil peds; few small root channels and roots.

Reddish-Brown Lateritic soils

Soils in this group are well drained and have a thin organic and organic-mineral layer over a yellowish-brown leached layer that rests on an illuvial, red horizon. These soils have formed under deciduous or mixed forests in a moist, warm, temperate climate (*12*). They are on high stream terraces.

In Fairfax County, soils of the Hiwassee series are within the central concept of the Reddish-Brown Lateritic great soil group. However, they do not fully conform to the definition because the A_2 horizon is reddish brown instead of yellowish brown. As a rule, the A_1 horizon is about 2 inches thick and consists of very dark brown loam or silt loam. The A_2 horizon extends to a depth of about 10 inches and is reddish-brown or dark reddish-brown loam or silt loam that has a moderately strong, granular structure. The B horizon extends to a depth of 30 inches or more and consists of red to dark-red clay with moderate, medium, subangular blocky structure. Some mica occurs throughout the profile; quartz pebbles and cobbles are common in places.

Sedimentary material is at a depth ranging from 4 to 10 feet or more. Compared to the Masada soils, the Hiwassee soils have a darker brown A horizon and a redder subsoil. The Hiwassee soils are strongly acid and probably have a base exchange capacity similar to that of the Davidson soils (not mapped in Fairfax Co.) of 13 to 16 milliequivalents per 100 grams of soil. The Hiwassee soils contain somewhat more organic matter than the Masada and other Red-Yellow Podzolic soils.

Reddish-Brown Lateritic soils intergrading to Red-Yellow Podzolic soils

Soils of the Montalto series are intergrades. The A horizon of the Montalto soils is less dark, and in general, the B horizon is less red than in soils that represent the central concept of the Reddish-Brown Lateritic profile. Much of the Montalto acreage in Fairfax County is within the color range of the Reddish-Brown Lateritic concept.

The Montalto soils have formed from products that weathered from syenite and syenitic diabase. The A horizon is brown to dark reddish-brown, fine, granular silt loam; the subsoil is red, friable silty clay to silty clay loam that has a fine, subangular blocky structure. The Montalto soils are well drained and have slopes in the range of less than 3 to about 14 percent. They are higher in calcium and less acid than the typical Red-Yellow Podzolic soils. They are associated with the Iredell and the Elbert soils, both of which have formed from the same parent-rock material as that of Montalto soils.

Reddish-Brown Lateritic soils intergrading to Planosols

Soils of the Mecklenburg series are intergrades. In Fairfax County, the Mecklenburg soils were mapped with the Iredell soils as a complex. Both of these soils have a characteristic plastic clay subsoil, and both have formed from the residuum of diabase and syenite. The Mecklenburg soils occupy higher parts of the landscape and have a browner surface layer and a redder subsoil than the Iredell.

Sols Bruns Acides

The Sols Bruns Acides are strongly to very strongly acid and have a low base status. They have a thin A_1 horizon, a paler intervening horizon (A_2 or possible B_1) that is difficult to distinguish from the B_2 horizon, and a B_2 horizon that is uniform in color and has little or no accumulation of silicate clay.

Soils of the Manor series are in this great soil group. The Manor soils have formed in the residuum of deeply weathered quartz and sericite schist. They occupy mainly hilly and steep uplands of the Piedmont. The surface layer is yellowish-brown, micaceous silt loam; the substratum is thick and consists of highly micaceous loam and silt loam soil material mixed with highly weathered fragments of schist and flakes of mica. According to Research Report No. 41 (*9*), the solum is low in clay, but the percentage of base saturation is high. A thin, weakly developed B horizon is characteristic in places.

Intrazonal Order

The intrazonal order is represented by the Low-Humic Gley soils and Planosols and the intergrades of soils in these groups to other great soil groups. A discussion of these great soil groups and the soil series in each follows.

Low-Humic Gley soils

The Low-Humic Gley soils are imperfectly drained to poorly drained and have a very thin A_1 layer that is moderately high in organic matter. Under this is a mottled gray and brown, gleylike mineral horizon with a low degree of textural differentiation (*12*). The Bowmansville, Wehadkee, Elkton, and Worsham series are in this great soil group.

Bowmansville and Wehadkee Series

Soils in both of these series have a low degree of textural differentiation and are strongly gleyed except in the predominantly brown, 4- to 6-inch surface layer. Both soils are moderately young and have developed in young alluvium. The Bowmansville has formed in general alluvium that originated from shaly sandstone and shale of the Triassic period, and the Wehadkee, in general alluvium that originated from igneous and related metamorphosed rocks.

Elkton and Worsham Series

Soils of the Elkton and Worsham series have strong horizonation and distinct boundaries between the A and B layers. (See profile of Worsham soil in fig. 11.) They are characterized by a slowly permeable B horizon that has a strong structure. They are poorly drained, strongly acid, nearly level, slowly permeable, and low in organic matter below the thin A_1 layer. The soils of both series occupy low positions, are subject to excess water in wet periods, and are droughty in dry periods.

Planosols

Planosols are a group of intrazonal soils (*12*) that have an eluviated surface layer underlain by a B horizon that is more strongly illuviated, cemented, or compacted than those in the associated normal soils. They have formed on nearly level upland surfaces under grass or forest vegetation in a humid or subhumid climate. Podzolization and gleization are processes involved in their formation (*11*). Planosols are characterized by the accumulation of a well-defined layer of clay or cemented material at various depths below the surface. This development has taken place on nearly level areas where drainage is restricted.

The Orange, Iredell, Kelly, Croton, and Elbert series are in this great soil group.

Orange Series

The Orange series consists of moderately well drained, light-colored soils that have a claypan in the lower subsoil. In most places, the soils are less than 50 inches thick to hard bedrock. The surface layer is light yellowish-brown to grayish-brown, friable silt loam; the upper subsoil to a depth of 16 or 24 inches is light yellowish-brown or yellowish-brown to light olive-brown, plastic silty clay loam. The lower 6 to 8 inches of the upper subsoil is mottled with gray and brown and generally contains some rounded black concretions. The lower subsoil is extremely plastic, massive clay mottled with light brownish gray, pale olive, and strong brown. The parent material is black, white, green, and gray, weathered sandy loam, 1 to 4 inches thick. This soil material is intermingled with fairly fresh fragments of hornblende and greenstone. Compared to the Colfax, the Orange soils are less micaceous, somewhat better drained, and shallower to bedrock.

Iredell and Kelly Series

Soils of both these series have an A horizon that is characteristic of the Gray-Brown Podzolic soils and a weakly developed, thin B horizon. Under the B horizon is plastic clay. (See profile of Iredell soil in fig. 11.) The soils of both series are somewhat poorly drained to moderately well drained, have gentle slopes, and are medium to strongly acid. The Iredell soils have formed from diabase and syenite; the Kelly, from mixed shaly sandstone and diabase of the Triassic formations. The Kelly soils have a lighter colored A horizon than the Iredell. The Iredell and Kelly soils are associated with the Elbert, Catlett, Mecklenburg, and Montalto soils.

Croton and Elbert Series

Soils of the Croton and Elbert series have strong horizonation and distinct boundaries between the A and B horizons. The Croton and Elbert soils are compact, are fine textured, and have slowly permeable B layers with strong structure. They are poorly drained, strongly acid, nearly level, slowly permeable, and low in organic matter below the thin A_1 layer. Both soils occupy low positions, are subject to excess water in wet periods, and are droughty in dry periods.

Planosols intergrading to Red-Yellow Podzolic soils

The Colfax series is an intergrade. Soils of this series are somewhat poorly drained and light colored. They have formed from granitic gneiss on flats at the bases of slopes and in depressions near the heads of upland drainageways. In most places, the Colfax soils have a distinct fragipan. The Colfax soils are lighter colored than the Appling; they have a brownish-yellow to grayish-brown or pale-yellow sandy loam surface layer and a brownish-yellow or faintly mottled brownish-yellow and grayish upper subsoil. At a depth of 16 to 26 inches there is a compacted horizon (fragipan) of sandy loam to loam. The fragipan generally is over highly mottled clay or clay loam that is plastic when wet and hard when dry. The parent material is highly mottled, gray, yellowish-brown, red, or strong-brown granite material that is fairly high in mica and quartz. The Colfax soils are associated with the Appling and Louisburg soils.

Azonal Order

The azonal order is represented by the Lithosols, Regosols, and Alluvial soils, and by soils in these groups that intergrade to other great soil groups. A discussion of these great soil groups and the soil series in each follows.

Lithosols

Lithosols have an incomplete solum or no clearly expressed soil morphology. They consist of freshly and imperfectly weathered masses of hard rock or fragments of hard rock. As a rule, they occupy steep slopes (*12*).

Soils of the Catlett and Bremo series are classified as Lithosols. The Catlett soils have formed in residuum mainly from granite gneiss, schist, shale, sandstone, and shaly sandstone. The Bremo soils have formed mainly from greenstone.

Because of topographic position, the loss of soil material through geologic erosion is too rapid to allow the formation of soils with mature profiles. Slopes generally are more than 7 percent. In some places a thin, weak A_2 horizon and a thin B horizon have formed. The latter has a weak, subangular blocky structure, more chroma, and a slightly finer texture than the overlying layer. A thin A_2 horizon is common in nearly all the Catlett and Bremo soils. Depth to bedrock ranges from shallow to very shallow; rock outcrops occur in some places.

Catlett Series

The Catlett soils are shallower than the Bremo and best conform to the definition of a Lithosol. They are somewhat excessively drained and are shallow to hard, baked shale and conglomerate of the Triassic period. The surface layer is pale-brown silt loam. Below this is grayish-brown silty clay loam. Gravel is common in nearly all Catlett soils in Fairfax County.

Profile of Catlett gravelly silt loam in a cutover forest:

A_1 0 to ½ inch, very dark brown (10YR 2/2) to dark reddish-brown (5YR 2/2), very friable silt loam; weak, fine to medium, granular structure; many small roots and much partly decomposed leaf litter.

A_2 ½ inch to 7 inches, dark-gray (5YR 4/1) to very dark gray (5YR 3/1), very friable silt loam mixed with small angular fragments of shaly sandstone; weak, fine, subangular blocky structure crushes readily to weak, fine, granular; roots numerous.

C_1 7 to 13 inches, dark-gray (5YR 4/1), friable shaly silt loam; indefinite structure; 25 to 50 percent of mass consists of gray to dark-gray, angular particles of shale up to 1½ inches in diameter.

C_2 13 to 20 inches, very dark grayish-brown (10YR 3/2) to dark-gray (10YR 4/1) weathered rock fragments; faint mottles of dark brown and gray.

Bremo Series

The Bremo soils have formed in the residuum of basic rocks, and they have little horizon development in the profile. They are somewhat excessively drained; slopes are more than 7 percent. The 5- or 6-inch surface layer is dark-brown silt loam. Below this is a matrix of silty clay loam soil material and variegated, partly decomposed greenstone or other basic rock. The Bremo soils are darker brown and more fertile than the Catlett soils.

All the acreage of Bremo soils in Fairfax County is intricately associated with the Orange soils and was mapped as a complex with them. In most places, the Bremo soils are dominant in the complex.

Lithosols intergrading to Red-Yellow Podzolic soils

Soils of the Louisburg series are intergrades. These soils have formed in the residuum of granite gneiss. The surface layer is grayish-brown sandy loam; the subsoil is yellowish-brown coarse sandy loam. The Louisburg soils have a weak, discontinuous B layer that is more common than that in the Catlett and the Bremo soils. Slopes are generally hilly to steep.

The Louisburg soils are associated with the Appling soils but occupy steeper ridge slopes below the Appling. The Louisburg soils resemble the Manor soils in relief, drainage, and color, but they are coarser in texture, contain less mica, and are shallower to bedrock.

Profile development in the Louisburg soils has advanced farthest on the long, smooth slopes adjacent to the Appling soils. In these positions, a weakly developed, reddish-yellow to yellowish-red sandy clay loam subsoil is common.

Regosols

Regosols have not formed genetic horizons. Their parent materials are deep deposits of unconsolidated rock (*14*).

Soils of the Galestown series are in this category. These are strongly acid to very strongly acid soils that have formed in unconsolidated sand on terraces of the lower Coastal Plain. Natural drainage is excessive, and the relief is very gently undulating. There is no manifestation of a textural or a structural development in the profile. However, a color B horizon has formed in most places. The 8-inch surface layer is yellowish-brown to brown, loose loamy fine sand; the subsoil is strong-brown, loose loamy fine sand that contains concretions and discontinuous iron pans in places. Colors in the subsoil vary from strong brown to pale yellow and almost white. The Galestown soils are associated with the Sassafras and the Woodstown soils.

Alluvial soils

Alluvial soils are young or very young soils that have formed in transported and fairly recently deposited alluvium. This material characteristically has been weakly modified (or is unmodified) by the soil-forming processes (*13*). As a rule, Alluvial soils have little contrast in color and texture throughout the profile. However, some areas show a notable degree of structural development. Alluvial soils generally contain more organic matter and are higher in pH than soils in the zonal and intrazonal orders. Classified as Alluvial soils are the Huntington, Bermudian, Meadowville, Manassas, Lindside, Chewacla, and Rowland series.

Huntington and Bermudian Series

The Huntington and Bermudian soils have formed in young general alluvium. They are well drained and are nearly free of mottling to a depth of 30 inches or more. Structural development is more common in the Huntington and Bermudian soils than in the less well-drained Alluvial soils. The Bermudian soils are reddish and strongly acid; the Huntington, brown and slightly alkaline.

Meadowville and Manassas Series

These soils differ because of characteristics in the parent material. Horizon development is expressed weakly by color and structural differences between the surface layer and the subsoil. As a rule, the surface layer is lower in chroma than the subsoil, but the subsoil has some structural development. Mottles in the Meadowville and Manassas soils are a little nearer the surface than in the Huntington and Bermudian soils.

Lindside, Chewacla, and Rowland Series

The Lindside, Chewacla, and Rowland soils are gleyed below a depth of 10 to 14 inches. They have little or no development of a blocky or of a subangular blocky structure. In general, the deep, gleyed layers have a little firmer texture than the surface layers.

The Rowland soils are associated with the well-drained Bermudian and the Bowmansville soils. The latter is a member of the Low-Humic Gley great soil group. The Chewacla is associated with the Wehadkee, a Low-Humic Gley soil. The Lindside is associated with the well-drained Huntington.

Additional Facts about Fairfax County

This section contains information about the organization, facilities, growth in population, and agriculture in the county.

Organization and Population

Fairfax County was named in honor of Thomas, the Sixth Lord Fairfax (*18*). Capt. John Smith, the first white person to visit the region, explored the Potomac River as far north as Great Falls in 1608. In 1742 Fairfax County was formed from Prince William County and given its present name. It then included what is now Loudoun and Arlington Counties, Va. The earliest settlement occured about 1690. The first county seat was established at Freedom Hill, 1 mile north of Vienna, in 1743. As the result of threats from warlike Indians, the county seat was moved to Alexandria in 1754, and to Fairfax, its present site, in 1799.

In 1910 Fairfax County had a population of about 20,000. Since 1940 the population has grown rapidly because large numbers of Federal employees in the District of Columbia have their homes in nearby Fairfax County. The county had a population of 275,002 in 1960 and will have an estimated population of 350,000 by 1980.

The increase in population has expanded the need for more schools, roads, and other public facilities. The demand for farmland competes with that for urban development. Expenses and high taxes have caused farmers to use scientific management to make farming profitable while their land is sought for other uses.

The increasing use of farmland for urban development makes it necessary for planning and governing authorities to know the suitability of soils for buildings, sewage-disposal systems, and other engineering works. The planning board, zoning commission, health department, school board, farmers, and gardeners all have use for the information furnished by the soil survey.

Transportation and Markets

Fairfax County is well supplied with railroads and hard-surfaced highways. Agricultural products can be delivered by motor freight to the markets of Washington, D.C., and Alexandria, Va., from any point in the county in less than 1 hour. Livestock markets in Baltimore, Md., are only about 50 miles from Fairfax County. Three railroads cross the county and lead to Washington, D.C.

United States Highways No. 50, 29, and 211 cross the county from east to west, and U.S. Highway No. 1 crosses the southeastern part of the county. All of these roads lead to Washington, D.C. Most farms are on or near a hard-surfaced State road. There are more than 600 miles of paved State roads in the county.

Facilities

The schools in Fairfax County have been consolidated and are located throughout the county. More than 13,000 pupils in the county are transported to and from public schools each day by buses. The school board constantly plans new facilities and hires new teachers for the 3,000 to 4,000 new pupils that enter the public schools each year.

Churches of many denominations are active throughout the county. Many new churches, as well as additions to old ones, have been built to accommodate the growth of their congregations.

As a rule, farm buildings are well kept, and many farm improvements have been made. This is particularly true on the more productive soils. In the northern and western parts of the county, modern dairy barns are conspicuous and intensive agriculture is practiced.

Farming on the poor soils is less intensive, and buildings are not maintained so well as on the more productive soils.

Industries

In the county are scientific research laboratories, quarries, gravel pits, distilleries, and sawmills. Agriculture is not a primary source of income. Many people in the county receive most or all of their income from employment in Government offices in the District of Columbia and surrounding areas. Construction is the second most important source of income, followed by public utilities, businesses, and professional and other types of services.

Agriculture

Before this area was settled by white men, the agriculture of the Indians consisted largely of growing small areas of corn. The Indians were chiefly hunters and did little farming. The early pioneers grew corn, wheat, and oats for subsistence and livestock feed. Tobacco was grown as a cash crop for export to England.

The growing of tobacco as a cash crop declined soon after the Civil War. At that time, poultry, cattle, sheep, and hogs became important as sources of cash. Livestock became more important as markets improved, and as railroads and highways were constructed. The rapid growth in population of the nearby District of Columbia made the production of milk an important source of income for many farmers in Fairfax County. The production of milk is still an important enterprise in the county. The small acreage that is still used for agriculture is kept in efficient production through the use of scientific methods.

Crops

The kinds of crops grown in the county have remained about the same for the last several decades. The acreage of these crops, however, has changed considerably. Table 9 gives the acreage of the main crops in stated years.

Corn is grown throughout the county, mainly on the Glenelg, Elioak, Manor, Bucks, and Penn soils and other soils closely associated with these. More oats and barley have been grown in the past several decades than wheat and rye. Little grain is sold, and three-fourths of all grain consumed is grown outside the county.

In normal seasons enough hay is grown to meet needs in the county. Hay, occupying the largest acreage of any crop in the county, is followed by corn, lespedeza, and alfalfa. Most hay is a mixture, in which orchardgrass is the largest component. Ladino and red clover are the basic legumes. Mixed hay yields about 2 tons per acre. Alfalfa yields from 1 to 3 tons of hay per acre according to census information in 1950 and 1954. Lespedeza yields from 1 to 1½ tons of hay per acre.

Alfalfa is grown mostly on the Glenelg, Elioak, and Bucks soils. Lespedeza and mixed hay are also grown on these soils and on soils that are not well suited to afalfa.

Garden vegetables are grown for home consumption on most of the farms, and small amounts of truck crops are sold locally on the fresh vegetable markets. Sweetpotatoes were grown on 44 acres according to the 1959 census.

TABLE 9.—*Acreages of the principal crops and number of fruit trees and grapevines of bearing age in stated years*

Crop	1939	1949	1959
	Acres	*Acres*	*Acres*
Corn harvested for grain	8, 047	4, 295	1, 421
Wheat threshed or combined	4, 013	3, 007	993
Oats threshed or combined	386	632	387
Rye threshed or combined	270	47	20
Barley threshed or combined	581	722	591
All hay	13, 936	17, 018	10, 196
Clover, timothy, and mixtures of clover and grasses cut for hay	6, 261	7, 682	4, 323
Lespedeza cut for hay	2, 655	4, 995	1, 621
Alfalfa and alfalfa mixtures cut for hay	1, 042	1, 903	1, 710
Other hay cut	3, 978	2, 438	2, 542
	Number [1]	*Number* [1]	*Number*
Apple trees	30, 452	15, 980	1, 032
Peach trees	6, 060	4, 246	2, 575
Pear trees	3, 022	1, 485	137
Plum trees	610	368	46
Cherry trees	1, 061	396	85
Grapevines	13, 032	6, 792	2, 691

[1] One year later than year given at head of column.

Fruit trees are on many farms. Three commercial orchards were in the county in 1954. In the last 20 years, however, the number of fruit trees has decreased considerably. The decrease has been caused mainly by large orchards having been sold and used for suburban development.

Cropping practices

A 5-year rotation is commonly used in the county. It consists of corn, followed by a small grain, and 3 years of pasture or hay (*15*).

Land intended for corn is usually prepared for seedbed immediately before planting. Corn harvested for grain is usually planted in the second and third weeks in May; that for silage, in the last week of May or the first two weeks in June. Most of the fertilizer used in the rotation is applied to corn and small grains. Few of the large operators have mechanical cornpickers; consequently, most of the corn is cut and shocked by hand.

The seedbed for small grain is prepared by disking land in corn stubble. The grain is drilled and fertilized at this time. However, some farmers topdress their crop after the plants have started to grow. Wheat is sown from October 15 to November 15. Barley and oats are sown a month earlier. Small grains are usually harvested by use of combines.

Hay usually follows small grain in the rotation. Grasses are generally sown with the grain in the fall; clover and lespedeza are sown in the spring on the small grain.

Pasture

In 1959 Fairfax County had 11,184 acres of plowable pasture, 2,806 acres of woodland pasture, and 9,273 acres of other pasture. Most pastures are in the livestock areas on the Glenelg, Elioak, Bucks, Penn, and Beltsville soils and on other soils associated with these. Rotational

pastures are grazed from 2 to 5 years and then are cultivated.

The better pastures are on the Glenelg, Elioak, and Bucks soils in which a high level of fertility is maintained. Pastures on these soils get lime, fertilizer, and manure. However, most pastures get but little ferilizer or lime; consequently, they have a lower carrying capacity than the better managed pastures. Bluegrass and whiteclover occur naturally in the county, especially on the Iredell and associated soils. Most pastures are a mixture of orchardgrass, timothy, redtop, lespedeza, red and white clovers, and a high percentage of undesirable grasses and weeds. Broomsedge and other undesirable grasses and weeds dominate in a large percentage of the pastures, especially on the small, general-purpose farms.

One of the basic pasture mixtures recommended in the county is 7 to 9 pounds of alfalfa, 12 pounds of orchardgrass, 4 to 6 pounds of timothy, 1 pound of ladino clover, and 4 to 5 pounds of red clover. per acre. This mixture is recommended by the county agent where an intensive pasture program is needed to obtain a high carrying capacity.

Fertilizer and lime

Fertilizer and lime are used generally throughout the county. Most of the fertilizer is ready mixed.

The general practice is to apply the fertilizer to the corn and small grains. On the better managed farms, fertilizer is applied to all crops in the cropping system.

Lime is applied to meet the needs of legumes because they have the highest lime requirement of the crops grown. The amount of lime needed depends on the kind of soil, the crop to be grown, and the reaction and amount of calcium and magnesium in the soil. The reaction and supply of calcium and magnesium in the soil depend on the inherent properties of the soil and its past treatment.

All crops except legumes generally need a complete fertilizer. Legumes, if properly inoculated and if soil conditions are right, can obtain the nitrogen they need from the air. Corn planted on coarse-textured soils should be given part of the nitrogen as a side dressing during the last cultivation. On the finer textured soils, all the nitrogen can be applied before corn is planted. In fertilizing small grains, it is generally advisable to apply part of the nitrogen as a topdressing late in winter or early in spring.

The need for fertilizer and lime differs in each field. The proper recommendations can be obtained from the county agricultural agent or State agricultural experiment station.

Livestock and livestock products

In 1959 there were 9,800 cattle on farms. Dairy and beef cattle are raised. Most of the livestock farms are in the northern and western parts of the county in the vicinity of Herndon, Forestville, and Centreville. Dairy cattle are primarily of the Holstein-Friesian and Guernsey breeds. A few grade Jerseys are raised on small farms. Beef cattle, chiefly of the Aberdeen-Angus and Hereford breeds, have increased during the past several years and now comprise about half the cattle in the county. According to the 1959 U.S. Census, 78 farms in the county produced an average of 25,938,781 pounds of whole milk. About one-fourth of these can be classified as commercial dairies. Nearly all milk is shipped to metropolitan area of Washington, D.C.

The number of swine has decreased from 10,302 in 1920 to 4,202 in 1959. This change was caused mainly by the trend in the corn-hog price ratio. Surplus corn is not fed to hogs when it brings more as grain on the market. The large majority of hogs in the county are of the bacon type. They are hybrids produced by crossing Landrace males and Poland China, Duroc, and Chester White females.

The number of sheep in the county has fluctuated considerably. The largest number, 2,363, was recorded in 1930; in 1959 the county had 361 sheep. The reduction in number of sheep is partly caused by roaming dogs. Hampshire and Southdown are the main breeds of sheep. Winter and early spring lambs are marketed in the Baltimore and local livestock markets. In the county, 1,572 pounds of wool were shorn in 1959.

Most farmers keep enough chickens for home use. A few have 50 to 500 chickens, from which they obtain considerable income. The number of chickens in the county has decreased from 173,678 in 1920 to 19,608 in 1959.

Horses and ponies are used primarily for recreation, but a few horses and mules are kept as work stock.

Farm tenure, equipment, land use, and size and type of farms

According to the 1959 U.S. Census of Agriculture, about 77 percent of all farms in the county were operated by their owners. The rest were operated by part owners, managers, or tenants.

The supply of skilled labor has not been adequate to meet the needs of dairy and livestock farms. Unskilled labor is in ample supply.

Equipment on farms as reported by the 1959 census was as follows: Telephones, 180 farms; grain combines, 28; cornpickers, 22; pickup hay balers, 68; tractors, 289.

Land use on farms as reported by the 1959 census was as follows:

	Acres
Cropland harvested	14,996
Cropland used only for pasture	11,184
Cropland not harvested and not pastured	2,603
Woodland pastured	2,806
Woodland not pastured	18,521
Other pasture (not cropland and not woodland)	9,273
Other land (house lots, roads, wasteland, etc.)	2,908
Land in farms	62,291

There were 428 farms in Fairfax County in 1959, with an average of 145.2 acres per farm. This contrasts with the number reported in the 1930 census, which was 1,244 farms, with an average of 99.4 acres per farm. Most farms have less than 50 acres. The trend in number and size of farms reflects the desire of many people to have the advantage of both city and country life.

Farms by type were reported in the 1954 census as follows:

	Number
Dairy farms	62
Poultry farms	5
Livestock farms and other than dairy and poultry	76
General farms	5
Miscellaneous and unclassified farms	280

Glossary

In this section technical terms are defined for the convenience of readers who cannot readily obtain other references on soils and agriculture. Most of the definitions are similar to those in published works on soil science (*7*) (*12*) (*13*) (*14*), soil and moisture conservation, soil surveying, and other publications of a technical nature.

Catena, soil. An association of soils developed from one kind of parent material but differing in characteristics because of differences in drainage or relief.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Colluvium (colluvial deposits). Mixed deposits of rock fragments and coarse soil material near the bases of steep slopes. The deposits have accumulated as the result of soil creep, slides, or local wash.

Consistence. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, crushes easily under moderate pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushed under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a wire when rolled between thumb and forefinger.

Sticky.—When dry, moderately resistant to pressure; can barely be broken between thumb and forefinger.

Cemented.—Hard and brittle; little affected by moistening.

Eluviation. The removal of material from a soil horizon by downward or lateral movement in solution and, to a lesser extent, in collodial suspension.

Fragipan. A loamy, brittle horizon that is very low in organic matter and clay and rich in silt or very fine sand. The layer is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison to the horizon or horizons above it.

Granular. Roughly spherical aggregates that may be either hard or soft, usually more firm than crumb and without the distinct faces of blocks. (See also, Structure, soil.)

Great soil group (soil classification). A broad group of soils having internal soil characteristics in common.

Green-manure crop. Any crop grown and plowed under for the purpose of improving the soil, especially through the addition of organic matter.

Horizon, soil. A layer of soil, approximately parallel to the land surface, and differing from adjacent genetically related layers in color, structure, texture, consistence, and biological and chemical characteristics.

A horizon.—The horizon at the surface. It contains organic matter, or it has been leached of soluble minerals and clay, or it shows the effects of both. The major A horizon may be subdivided into A_1, that part that is darkest in color because it contains organic matter and A_2, the part that is the most leached and light-colored layer in the profile. In woodlands, a layer of organic matter accumulates on top of the mineral soil; this layer is called the A_0 horizon. The depth of the soil, however, is measured from the top of the mineral soil because the A_0 horizon is rapidly destroyed if fire occurs or if the soil is cultivated. Where the upper layers of the soil are thoroughly mixed by cultivation, the plowed layer is called the A_p horizon.

B horizon.—The horizon in which clay, minerals, or other material has accumulated, or which has developed a characteristic blocky or prismatic structure, or which shows the characteristics of both processes. It may be subdivided into B_1, B_2, B_3 horizons. The B_2 horizon may be subdivided further by adding a number to the symbol, such as B_{21}, B_{22}, or B_{23}.

C horizon.—The unconsolidated material immediately under the true soil. In chemical, physical, and mineral composition it is presumed to be similar to the material from which at least part of the overlying solum has developed.

D horizon.—The stratum beneath the parent material. It may be unlike the parent material of the soil. If it consists of solid rock like that from which the parent material has developed, it is designated as D_r.

Illuviation. The accumulation of material in a soil horizon by precipitation after downward or lateral movement in solution, or to a lesser extent, in suspension.

Internal drainage. The movement of water through the soil profile. The rate of movement is affected by the texture of the surface soil and subsoil, and by the height of the ground water table, either permanent or perched. Relative terms for expressing internal drainage are: *None, very slow, slow, medium, rapid,* and *very rapid.*

Mottled. Irregular spots of color in soil that vary in number and size. Descriptive terms are: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many;* and size—*fine, medium,* and *coarse.* The size measurements are: *Fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural drainage. Refers to the conditions that existed during the development of the soil as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by such factors as sudden deepening of channels or blocking of drainage outlets. The following relative terms are used to express natural drainage: *Very poorly drained, poorly drained, imperfectly* or *somewhat poorly drained, moderately well drained, well drained, somewhat excessively drained,* and *excessively drained.*

Very poorly drained.—Water is removed from the soil so slowly that the water table remains at or on the surface the greater part of the time.

Poorly drained.—Water is removed so slowly that the soil remains wet a large part of the time. The water table is commonly at or near the surface during a considerable part of the year.

Imperfectly or somewhat poorly drained.—Water is removed from the soil slowly enough to keep it wet for significant periods but not all of the time.

Moderately well drained.—Water is removed from the soil slowly, so that the profile is wet for a small but significant part of the time.

Well drained.—Water is removed from the soil readily but not rapidly. A well-drained soil has "good" drainage.

Somewhat excessively drained.—Water is removed from the soil rapidly, so that only a relatively small part is available to plants. Only a narrow range of crops can be grown on these soils, and yields are usually low without irrigation.

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils commonly are shallow to bedrock and may be steep, very porous, or both. Enough precipitation commonly is lost from these soils to make them unsuitable for ordinary crop production.

Parent material. The horizon of weathered rock or partly weathered soil material from which the soil has formed; horizon C in the soil profile.

Permeability, soil. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are: *Very slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phase, soil. That subdivision of a soil type having variations in characteristics not significant to the classification of this soil in its natural landscape but significant to the use and management of the soil. The variations are chiefly in such external characteristics as relief, stoniness, or erosion.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of the soil, expressed in pH values or in words as follows:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher.

Runoff. Surface drainage of rain or melted snow.

Series, soil. A group of soils that have genetic horizons similar, except for the texture of the surface soil, as to differentiating characteristics and arrangement in the soil profile, and developed from a particular type of parent material. A series may include two or more soil types that differ from one another in the texture of the surface soil.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soils includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying parent material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The aggregation of primary soil particles into compound particles, or clusters of primary particles, which are separated from adjoining aggregates by surfaces of weakness. Soil structure is classified according to *grade, class,* and *type.*

Grade.—Distinctness of aggregation. It expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: Structureless (single grain or massive), weak, moderate, and strong.

Class.—Size of soil aggregates. Terms: Very fine or very thin, fine or thin, medium, coarse or thick, and very coarse or very thick.

Type.—Shape and arrangement of individual natural soil aggregates. Terms: Platy, prismatic, columnar, blocky, subangular blocky, granular, and crumb. (Example of soil-structure grade, class, and type: Moderate, coarse, subangular blocky.) Principal structure types in this county are blocky, subangular blocky, and granular. Fine, blocky structure peds (aggregates or units) are 5 to 10 millimeters (0.2 to 0.4 inch) in size; medium, blocky or subangular blocky, 10 to 20 millimeters (0.4 to 0.8 inch); and coarse, subangular blocky, 20 to 50 milimeters (0.8 inch to 2.0 inches). Fine, granular structure peds are 1 to 2 millimeters (0.04 to 0.08 inch) in size and medium, granular structure peds are 2 to 5 millimeters (0.08 to 0.2 inch) in size.

Subsoil. Technically, the B horizon of soils with distinct profiles; roughly, that part of the profile below plow depth.

Substratum. Any layer lying beneath the solum or true soil; the C and D horizon.

Surface soil. Technically, the A horizon; commonly, the part of the upper profile to a depth of about 5 or 8 inches; the layer usually stirred by plowing.

Terrace (for control of surface runoff, erosion, or both). An embankment or ridge constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surplus runoff in order to retard it for infiltration into the soil and so that any excess may flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, usually flat or undulating, bordering a stream; frequently called second bottom as contrasted with flood plain; seldom subject to overflow.

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically, it refers to the proportions of sand, silt, and clay. Some of the soil textural classes are:

Clay.—As a soil textural class, soil material that contains 40 percent or more of clay, less than 45 percent sand, and less than 40 percent silt. As a soil separate, the mineral soil particles are less than 0.002 millimeter (0.000079 inch) in diameter.

Loam.—Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Sand.—As a soil textural class, soil material that contains 85 percent or more sand and not more than 10 percent clay. As a soil separate, the individual rock or mineral fragments range from 0.05 millimeter (0.002 inch) to 2.0 millimeters (0.079 inch) in diameter.

Sandy loam.—Soil material that contains 20 percent clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30, and 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 percent and 52 percent sand.

Silt.—As a soil textural class, soil material that contains 80 percent or more of silt and less than 12 percent of clay. As a soil separate, the individual mineral soil particles range from 0.002 millimeter (0.000079 inch) to 0.05 millimeter (0.002 inch) in diameter.

Silt loam.—Soil material that contains 50 percent or more silt and 12 to 27 percent clay, or 50 to 80 percent silt and less than 12 percent clay.

Type, soil. A subdivision of the soil series based on the texture of the surface layer.

Upland (geologic). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace.

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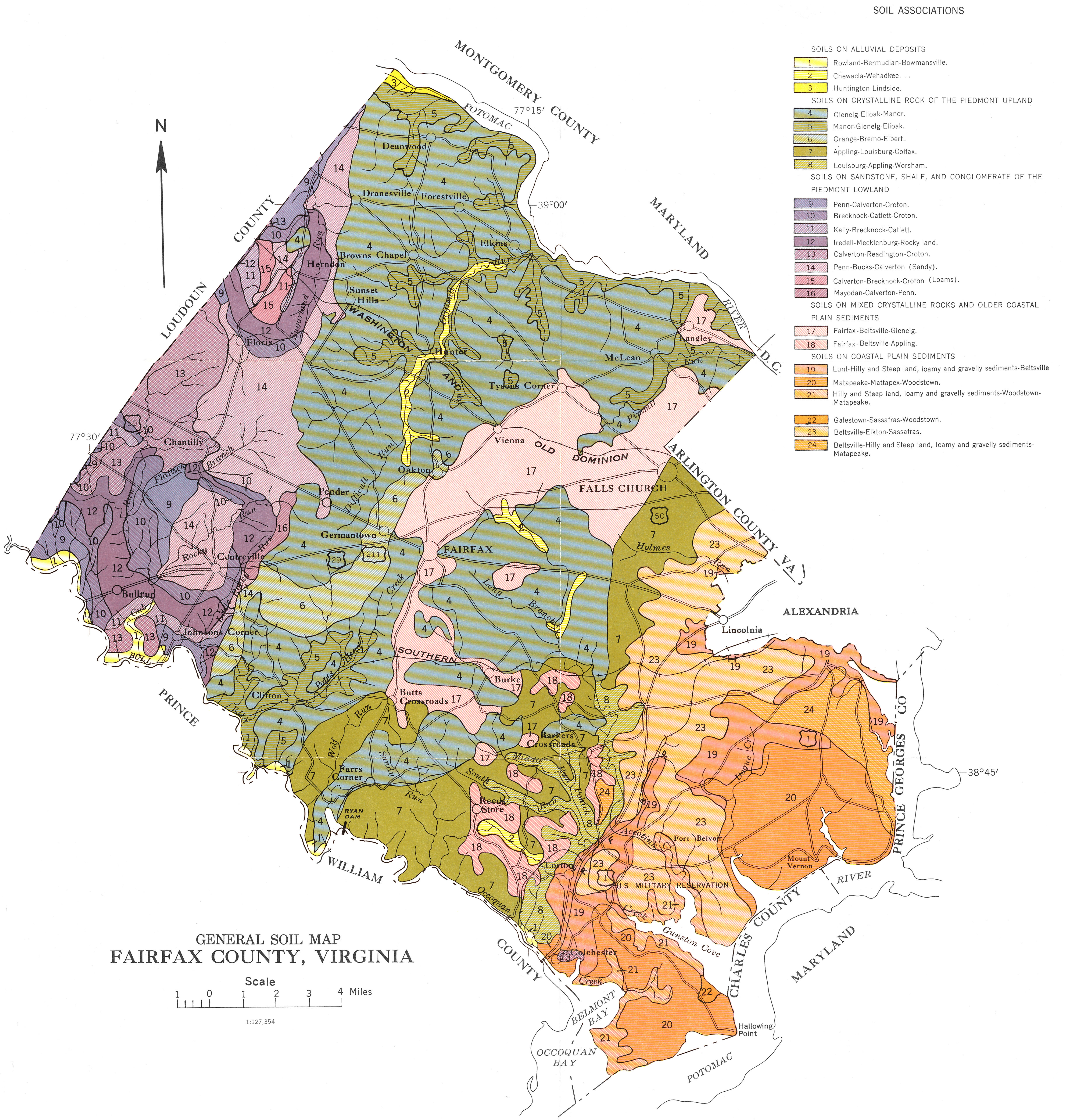
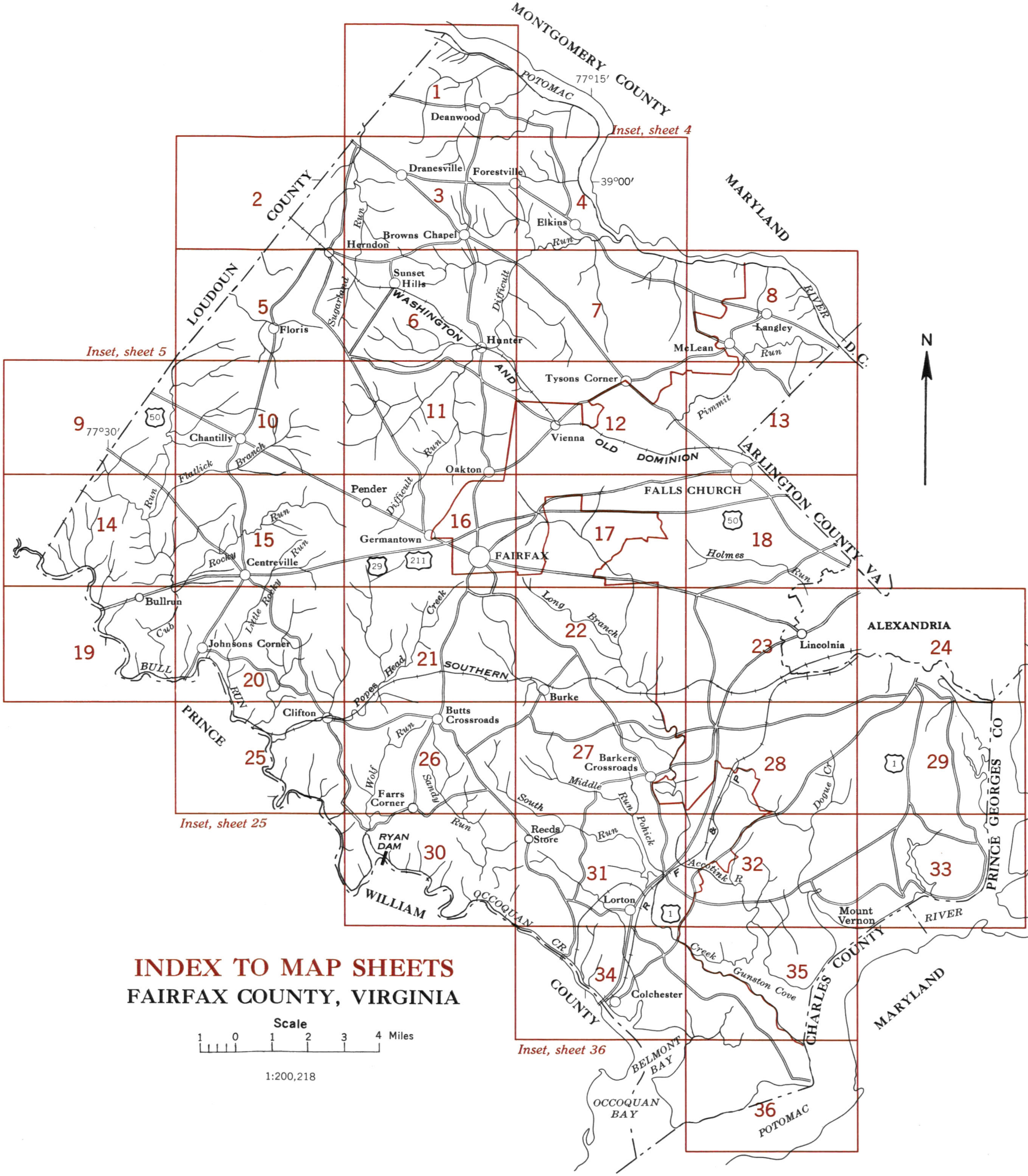


GENERAL SOIL MAP
FAIRFAX COUNTY, VIRGINIA



INDEX TO MAP SHEETS

FAIRFAX COUNTY, VIRGINIA

Scale

1 0 1 2 3 4 Miles

1:200,218

SOILS LEGEND

SYMBOL	NAME
Aa	Appling gritty loam, eroded undulating phase
Ab	Appling gritty loam, eroded rolling phase
Ac	Appling gritty loam, eroded hilly phase
Ba	Beltsville loam, undulating phase
Bb	Beltsville silt loam, undulating phase
Bc	Bermudian silt loam
Bd	Birdsboro silt loam, eroded undulating phase
Be	Bowmansville silt loam
Bf	Brecknock loam, undulating phase
Bg	Brecknock loam, eroded rolling phase
Bh	Brecknock silt loam, eroded undulating phase
Bk	Brecknock silt loam, eroded rolling phase
Bm	Bremo-Orange silt loams, rolling phases
Bn	Bucks loam, undulating phase
Bo	Bucks silt loam, eroded undulating phase
Ca	Calverton loam, undulating phase
Cb	Calverton silt loam, nearly level phase
Cc	Calverton silt loam, undulating phase
Cd	Catlett gravelly silt loam, undulating phase
Ce	Catlett gravelly silt loam, eroded rolling phase
Cf	Catlett gravelly silt loam, eroded hilly phase
Cg	Chewacla silt loam
Ch	Colfax loam, undulating phase
Ck	Croton silt loam
Ea	Elbert silt loam
Eb	Elioak silt loam, eroded undulating phase
Ec	Elioak silt loam, eroded rolling phase
Ed	Elioak silt loam, severely eroded rolling phase
Ee	Elioak silt loam, eroded hilly phase
Ef	Elkton silt loam
Eg	Enon silt loam, eroded undulating phase
Eh	Enon silt loam, eroded rolling phase
Fa	Fairfax loam, undulating phase
Fb	Fairfax silt loam, undulating phase
Fc	Fairfax silt loam, eroded rolling phase
Ga	Galestown loamy fine sand
Gb	Glenelg silt loam, undulating phase
Gc	Glenelg silt loam, eroded rolling phase
Gd	Glenelg silt loam, severely eroded rolling phase
Ge	Glenelg silt loam, eroded hilly phase
Gf	Glenelg silt loam, severely eroded hilly phase
Gg	Glenville silt loam
Ha	Hilly land, loamy and gravelly sediments
Hb	Huntington silt loam
Ia	Iredell silt loam
Ib	Iredell-Mecklenburg silt loams, eroded undulating phases
Ic	Iredell-Mecklenburg silt loams, eroded rolling phases
Id	Iredell-Mecklenburg stony silt loams, eroded undulating phases
Ie	Iredell-Mecklenburg stony silt loams, eroded rolling phases
Ka	Kelly silt loam, undulating phase
La	Lenoir silt loam
Lb	Lindside silt loam
Lc	Lloyd loam, eroded undulating phase
Ld	Louisburg coarse sandy loam, rolling phase
Le	Louisburg coarse sandy loam, hilly phase
Lf	Louisburg coarse sandy loam, steep phase
Lg	Lunt fine sandy loam, undulating phase
Lh	Lunt fine sandy loam, eroded rolling phase
Lk	Lunt fine sandy loam, eroded hilly phase
Ma	Manassas silt loam
Mb	Manor silt loam, rolling phase
Mc	Manor silt loam, hilly phase
Md	Manor silt loam, eroded hilly phase
Me	Manor silt loam, steep phase
Mf	Marsh
Mg	Masada gravelly loam, eroded rolling phase
Mh	Matapeake silt loam, nearly level phase
Mk	Matapeake silt loam, undulating phase
Mm	Mattapex silt loam, nearly level phase
Mn	Mattapex silt loam, undulating phase
Mo	Mayodan silt loam, undulating phase
Mp	Meadowville silt loam
Mr	Mixed alluvial land
Ms	Montalto silt loam, eroded rolling phase
Oa	Orange silt loam, undulating phase
Pa	Penn fine sandy loam, eroded undulating phase
Pb	Penn fine sandy loam, eroded rolling phase
Pc	Penn fine sandy loam, eroded hilly phase
Pd	Penn loam, eroded undulating phase
Pe	Penn loam, eroded rolling phase
Pf	Penn loam, eroded hilly phase
Pg	Penn shaly silt loam, eroded rolling phase
Ph	Penn shaly silt loam, eroded hilly phase
Pk	Penn shaly silt loam, eroded steep phase
Pm	Penn silt loam, eroded undulating phase
Pn	Penn silt loam, eroded rolling phase
Po	Penn silt loam, eroded hilly phase
Ra	Raritan silt loam
Rb	Readington silt loam, undulating phase
Rc	Rocky land, rolling basic rock phase
Rd	Rocky land, hilly acidic rock phase
Re	Rocky land, steep acidic rock phase
Rf	Rolling land, loamy and gravelly sediments
Rg	Rowland silt loam
Sa	Sassafras fine sandy loam, nearly level phase
Sb	Sassafras fine sandy loam, undulating phase
Sc	Sassafras fine sandy loam, eroded rolling phase
Sd	Steep land, loamy and gravelly sediments
Se	Swamp
Va	Very rocky land, hilly acidic rock phase
Vb	Very rocky land, rolling basic rock phase
Wa	Wehadkee silt loam
Wb	Wickham and Hiwassee loams, undulating phases
Wc	Woodstown fine sandy loam, nearly level phase
Wd	Woodstown fine sandy loam, undulating phase
We	Worsham silt loam

Soils surveyed 1953-1955 by H. C. Porter, J. F. Derting, and J. H. Elder, Virginia Agricultural Experiment Station, and R. F. Pendleton, Soil Conservation Service.
Correlation by Glenn H. Robinson, Soil Conservation Service.

Soil map constructed 1958 by Cartographic Division, Soil Conservation Service, USDA, from 1954 aerial photographs. Controlled mosaic based on Virginia plane coordinate system, north zone, Lambert conformal conic projection, 1927 North American datum.

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S. (33)

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

Pits, gravel or other

Power line

Pipeline

Cemetery

Dam

Levee

Tank

Oil well

Windmill

Canal lock (point upstream)

BOUNDARIES

- National or state
- County
- Township, civil (indefinite)
- Township, U. S.
- Section line, corner
- City (corporate)
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.
- Crossable with tillage implements
- Not crossable with tillage implements

Canals and ditches (CANAL, DITCH)

Canal (abandoned)

Lakes and ponds
- Perennial
- Intermittent

Wells (flowing)

Springs

Marsh

Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

- Soil type outline and symbol — Dx
- Gravel
- Stones
- Rock outcrops
- Spotted, thin or very small areas of old alluvial overlay over Piedmont soils — T
- Kitchen midden — #
- Sand spot
- Gumbo or scabby spot
- Made land
- Erosion
  - Uneroded spot — U
  - Sheet, moderate — S
  - Sheet, severe — SS
  - Gully, moderate — G
  - Gully, severe — GG
  - Sheet and gully, moderate — SG
  - Wind, moderate
  - Wind, severe
  - Blowout
  - Wind hummock
  - Overblown soil
- Gullies
- Areas of alkali and salts
  - Strong — A
  - Moderate — M
  - Slight — S
  - Free of toxic effect — F
- Sample location — 26
- Saline spot — +

GUIDE TO MAPPING UNITS AND CAPABILITY UNITS

Map symbol	Soil	Page	Capability Unit	Capability Page
Aa	Appling gritty loam, eroded undulating phase	5	IIe-2	50
Ab	Appling gritty loam, eroded rolling phase	6	IIIe-1	51
Ac	Appling gritty loam, eroded hilly phase	6	IVe-1	52
Ba	Beltsville loam, undulating phase	7	IIIw-1	51
Bb	Beltsville silt loam, undulating phase	6	IIIw-1	51
Bc	Bermudian silt loam	7	IIw-3	51
Bd	Birdsboro silt loam, eroded undulating phase	8	IIe-1	50
Be	Bowmansville silt loam	8	IVw-2	53
Bf	Brecknock loam, undulating phase	9	IIe-2	50
Bg	Brecknock loam, eroded rolling phase	9	IIIe-1	51
Bh	Brecknock silt loam, eroded undulating phase	9	IIe-2	50
Bk	Brecknock silt loam, eroded rolling phase	9	IIIe-1	51
Bm	Bremo-Orange silt loams, rolling phases	10	IVe-3	53
Bn	Bucks loam, undulating phase	10	IIe-1	50
Bo	Bucks silt loam, eroded undulating phase	10	IIe-1	50
Ca	Calverton loam, undulating phase	11	IIIw-1	51
Cb	Calverton silt loam, nearly level phase	11	IIIw-1	51
Cc	Calverton silt loam, undulating phase	11	IIIw-1	51
Cd	Catlett gravelly silt loam, undulating phase	12	IIIe-2	51
Ce	Catlett gravelly silt loam, eroded rolling phase	12	IVe-2	52
Cf	Catlett gravelly silt loam, eroded hilly phase	12	VIe-2	54
Cg	Chewacla silt loam	13	IIIw-2	52
Ch	Colfax loam, undulating phase	13	IIIw-1	51
Ck	Croton silt loam	14	IVw-2	53
Ea	Elbert silt loam	15	Vw-1	53
Eb	Elioak silt loam, eroded undulating phase	15	IIe-2	50
Ec	Elioak silt loam, eroded rolling phase	16	IIIe-1	51
Ed	Elioak silt loam, severely eroded rolling phase	16	IVe-1	52
Ee	Elioak silt loam, eroded hilly phase	16	IVe-1	52
Ef	Elkton silt loam	17	IIIw-3	52
Eg	Enon silt loam, eroded undulating phase	17	IIe-1	50
Eh	Enon silt loam, eroded rolling phase	17	IIIe-1	51
Fa	Fairfax loam, undulating phase	18	IIe-3	50
Fb	Fairfax silt loam, undulating phase	18	IIe-3	50
Fc	Fairfax silt loam, eroded rolling phase	18	IIIe-1	51
Ga	Galestown loamy fine sand	19	IIIs-1	52
Gb	Glenelg silt loam, undulating phase	19	IIe-2	50
Gc	Glenelg silt loam, eroded rolling phase	20	IIIe-1	51
Gd	Glenelg silt loam, severely eroded rolling phase	20	IVe-1	52
Ge	Glenelg silt loam, eroded hilly phase	21	IVe-1	52
Gf	Glenelg silt loam, severely eroded hilly phase	21	VIe-1	53
Gg	Glenville silt loam	21	IIw-1	50
Ha	Hilly land, loamy and gravelly sediments	22	VIe-2	54
Hb	Huntington silt loam	22	IIw-3	51
Ia	Iredell silt loam	23	IVw-1	53
Ib	Iredell-Mecklenburg silt loams, eroded undulating phases	23	IVe-3	53
Ic	Iredell-Mecklenburg silt loams, eroded rolling phases	24	IVe-3	53
Id	Iredell-Mecklenburg stony silt loams, eroded undulating phases	24	VIs-1	54
Ie	Iredell-Mecklenburg stony silt loams, eroded rolling phases	24	VIs-1	54
Ka	Kelly silt loam, undulating phase	24	IVw-1	53
La	Lenoir silt loam	25	IIIw-3	52
Lb	Lindside silt loam	25	IIIw-2	52
Lc	Lloyd loam, eroded undulating phase	26	IIe-1	50

GUIDE TO MAPPING UNITS AND CAPABILITY UNITS—Continued

Map symbol	Soil	Page	Capability Unit	Capability Page
Ld	Louisburg coarse sandy loam, rolling phase	27	IVe-2	52
Le	Louisburg coarse sandy loam, hilly phase	27	VIe-2	54
Lf	Louisburg coarse sandy loam, steep phase	27	VIIe-1	54
Lg	Lunt fine sandy loam, undulating phase	27	IIe-2	50
Lh	Lunt fine sandy loam, eroded rolling phase	28	IIIe-1	51
Lk	Lunt fine sandy loam, eroded hilly phase	28	VIe-2	54
Ma	Manassas silt loam	28	IIw-1	50
Mb	Manor silt loam, rolling phase	29	IVe-2	52
Mc	Manor silt loam, hilly phase	29	VIe-2	54
Md	Manor silt loam, eroded hilly phase	29	VIe-2	54
Me	Manor silt loam, steep phase	30	VIIe-1	54
Mf	Marsh	30	VIIw-1	55
Mg	Masada gravelly loam, eroded rolling phase	30	IVe-2	52
Mh	Matapeake silt loam, nearly level phase	31	I-1	50
Mk	Matapeake silt loam, undulating phase	31	IIe-1	50
Mm	Mattapex silt loam, nearly level phase	31	IIw-2	50
Mn	Mattapex silt loam, undulating phase	32	IIe-3	50
Mo	Mayodan silt loam, undulating phase	32	IIe-3	50
Mp	Meadowville silt loam	32	IIw-1	50
Mr	Mixed alluvial land	33	Vw-1	53
Ms	Montalto silt loam, eroded rolling phase	33	IIIe-1	51
Oa	Orange silt loam, undulating phase	34	IVe-3	53
Pa	Penn fine sandy loam, eroded undulating phase	35	IIIe-2	51
Pb	Penn fine sandy loam, eroded rolling phase	35	IVe-2	52
Pc	Penn fine sandy loam, eroded hilly phase	35	VIe-2	54
Pd	Penn loam, eroded undulating phase	35	IIIe-2	51
Pe	Penn loam, eroded rolling phase	35	IVe-2	52
Pf	Penn loam, eroded hilly phase	35	VIe-2	54
Pg	Penn shaly silt loam, eroded rolling phase	37	IVe-2	52
Ph	Penn shaly silt loam, eroded hilly phase	37	VIe-2	54
Pk	Penn shaly silt loam, eroded steep phase	37	VIIe-1	54
Pm	Penn silt loam, eroded undulating phase	36	IIIe-2	51
Pn	Penn silt loam, eroded rolling phase	36	IVe-2	52
Po	Penn silt loam, eroded hilly phase	36	VIe-2	54
Ra	Raritan silt loam	37	IIIw-1	51
Rb	Readington silt loam, undulating phase	38	IIIw-1	51
Rc	Rocky land, rolling basic rock phase	38	VIs-1	54
Rd	Rocky land, hilly acidic rock phase	38	VIIs-1	55
Re	Rocky land, steep acidic rock phase	39	VIIs-1	55
Rf	Rolling land, loamy and gravelly sediments	39	IVe-2	52
Rg	Rowland silt loam	39	IIIw-2	52
Sa	Sassafras fine sandy loam, nearly level phase	40	I-1	50
Sb	Sassafras fine sandy loam, undulating phase	40	IIe-1	50
Sc	Sassafras fine sandy loam, eroded rolling phase	40	IIIe-1	51
Sd	Steep land, loamy and gravelly sediments	41	VIIe-1	54
Se	Swamp	41	VIIw-1	55
Va	Very rocky land, hilly acidic rock phase	41	VIIs-1	55
Vb	Very rocky land, rolling basic rock phase	41	VIIs-1	55
Wa	Wehadkee silt loam	41	IVw-2	53
Wb	Wickham and Hiwassee loams, undulating phases	42	IIe-1	50
Wc	Woodstown fine sandy loam, nearly level phase	42	IIw-2	50
Wd	Woodstown fine sandy loam, undulating phase	43	IIe-3	50
We	Worsham silt loam	43	Vw-1	53

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0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

FAIRFAX COUNTY, VIRGINIA

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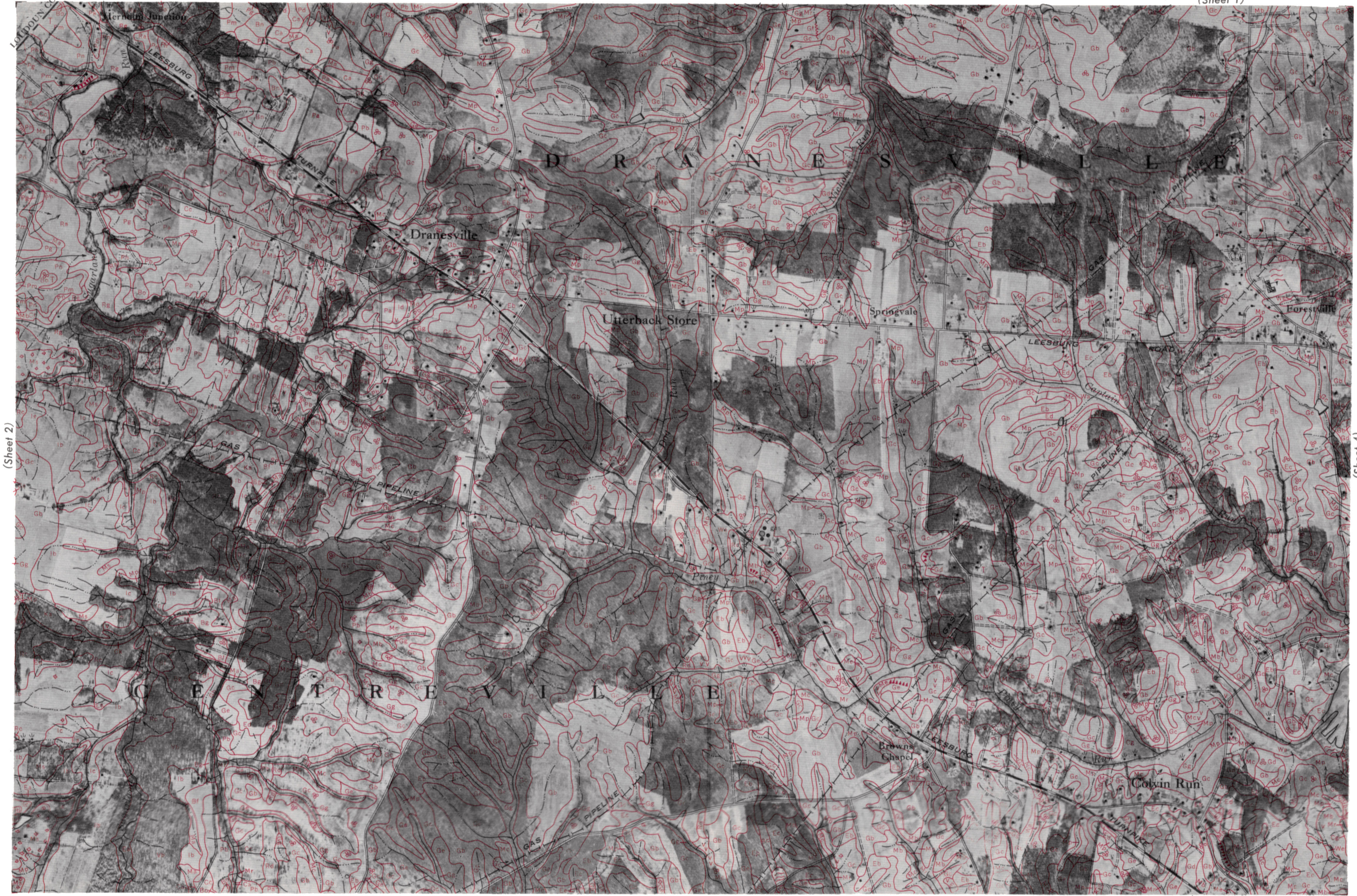

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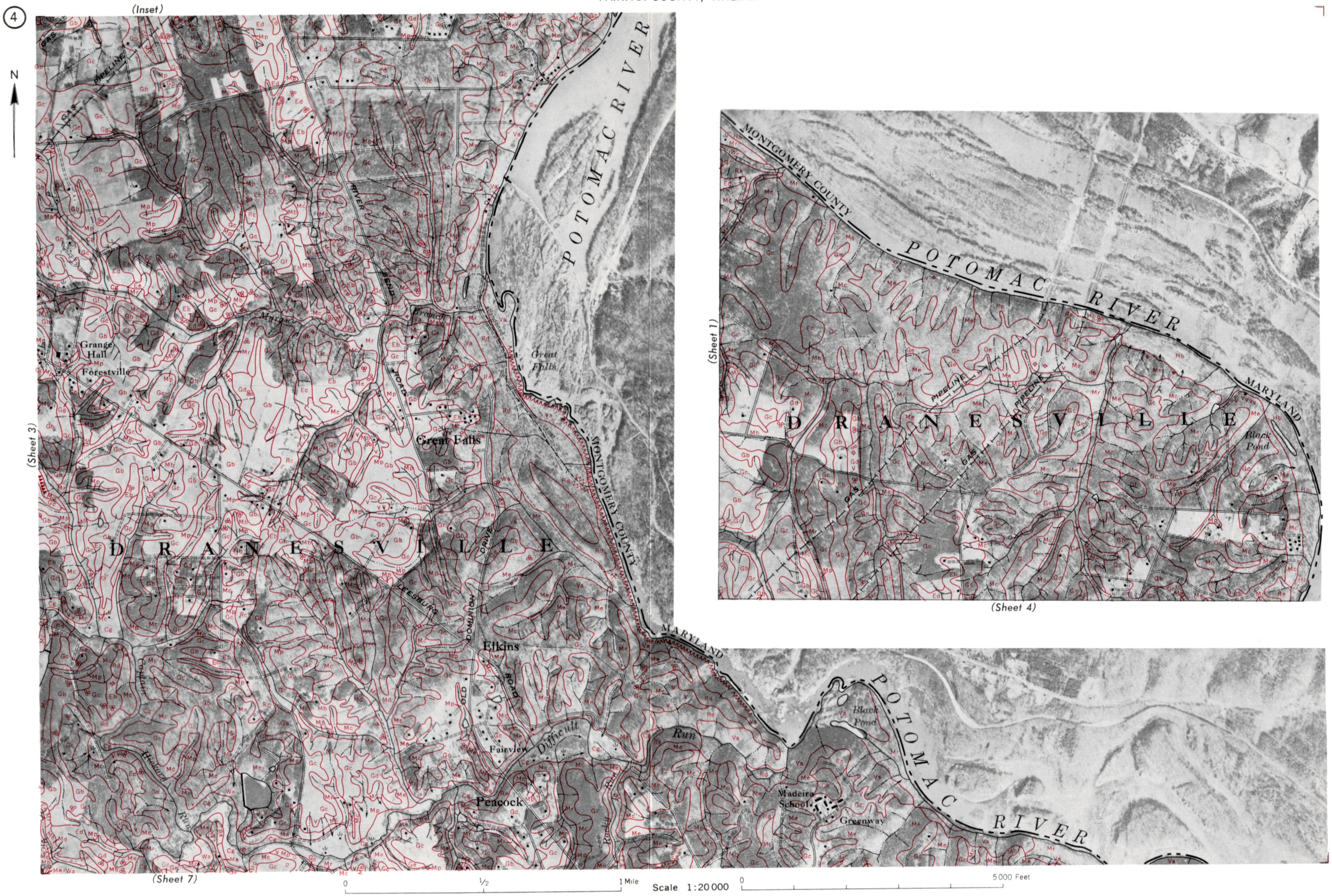

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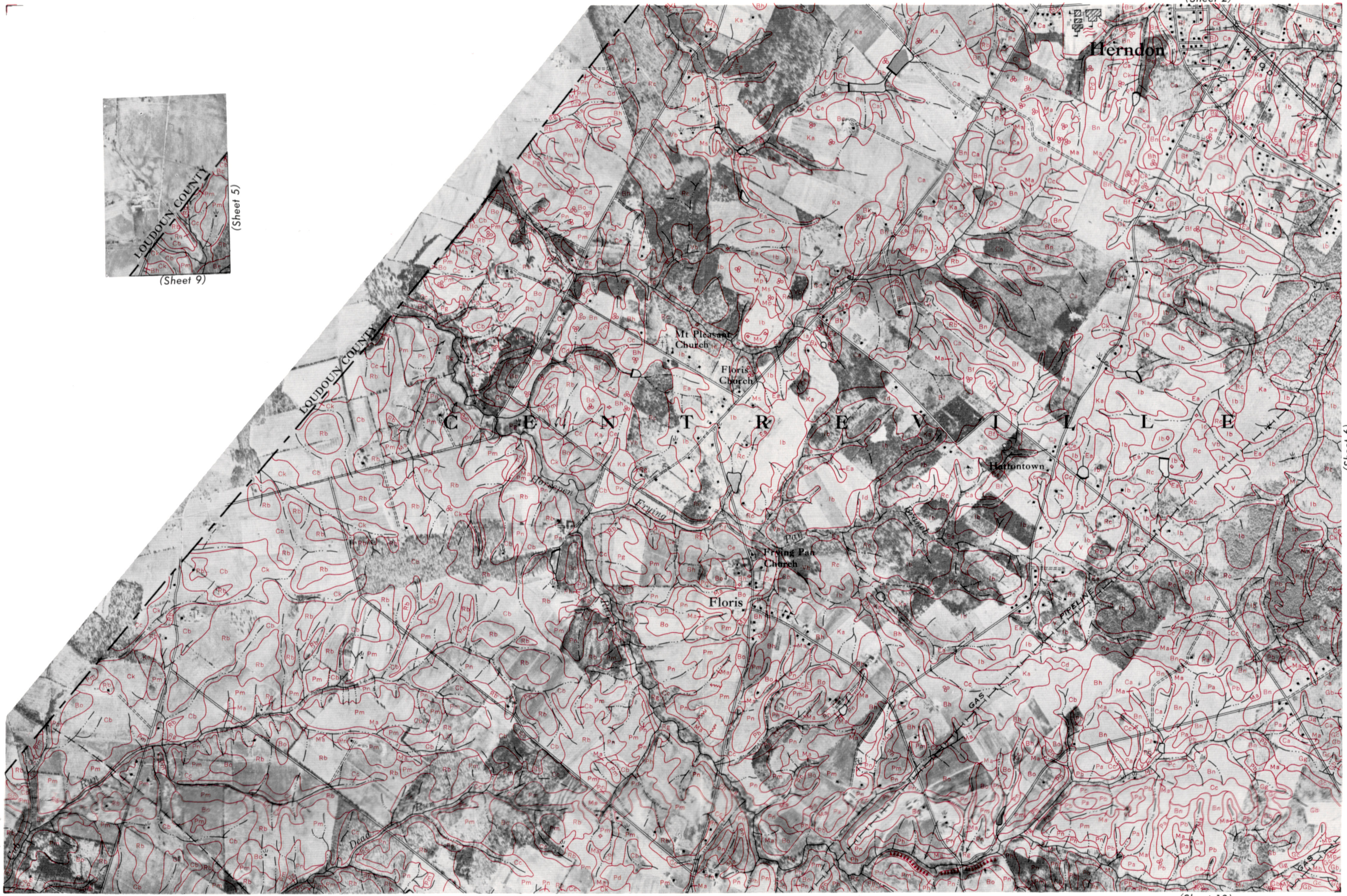

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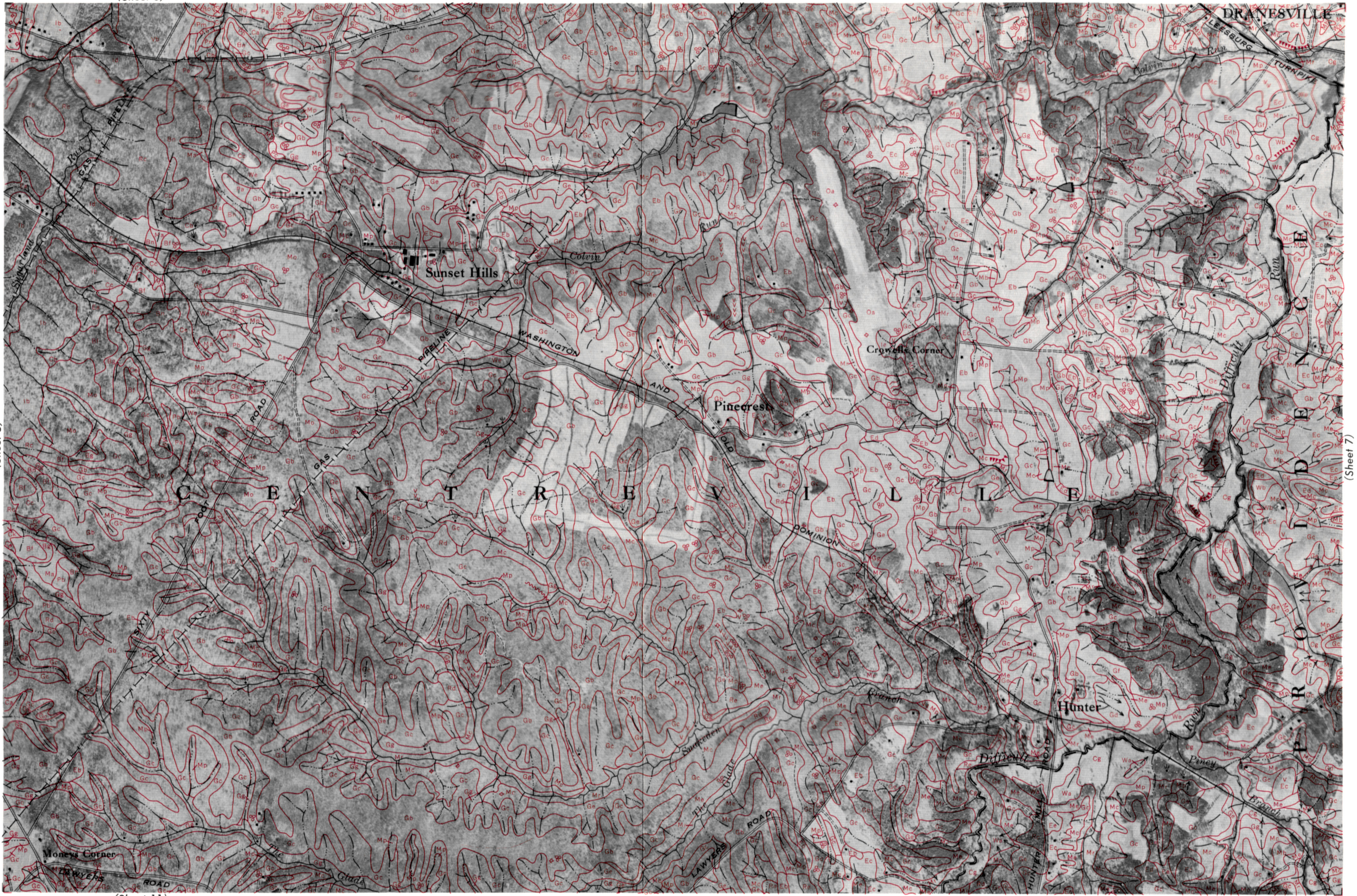

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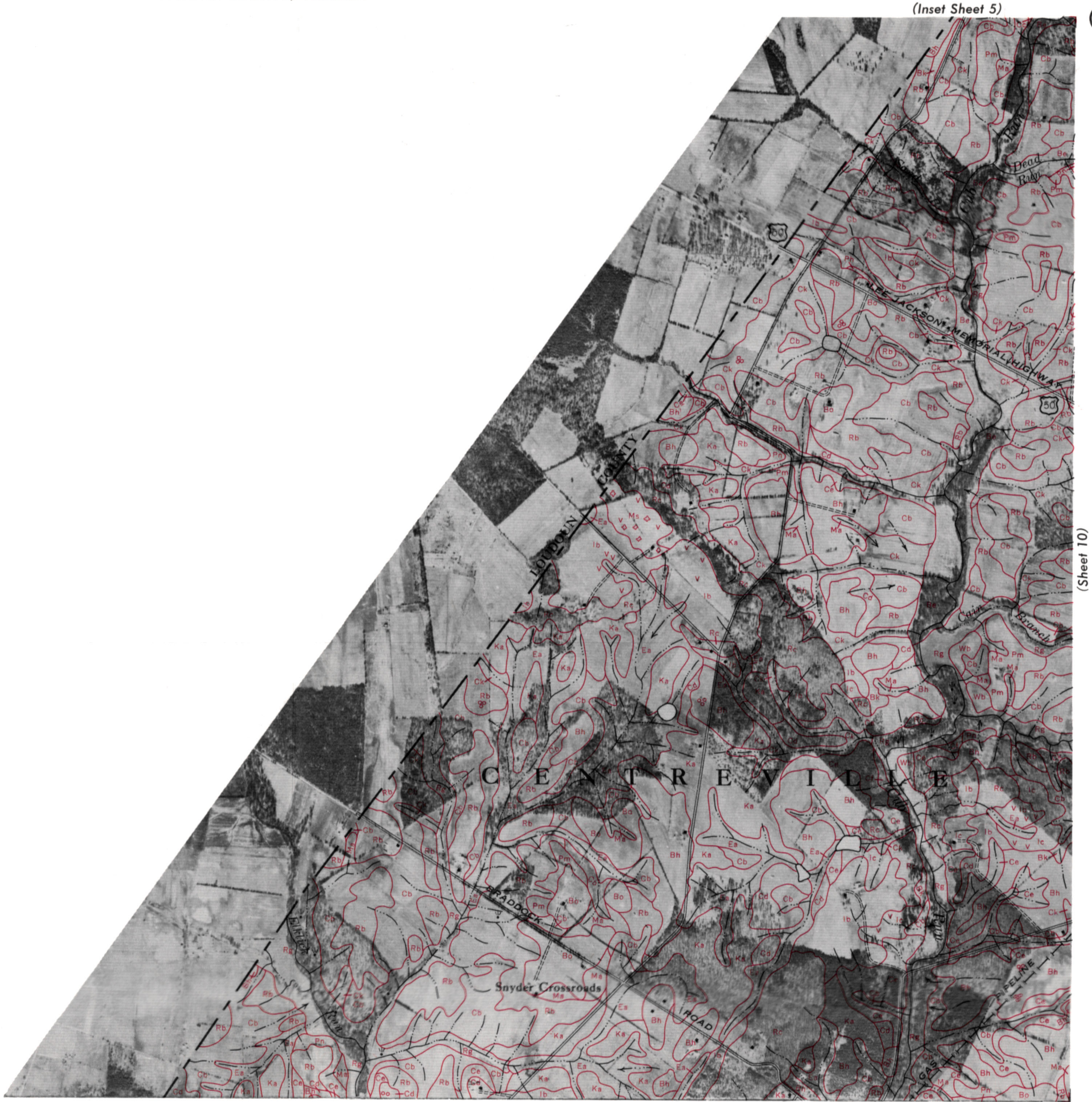

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FAIRFAX COUNTY, VIRGINIA

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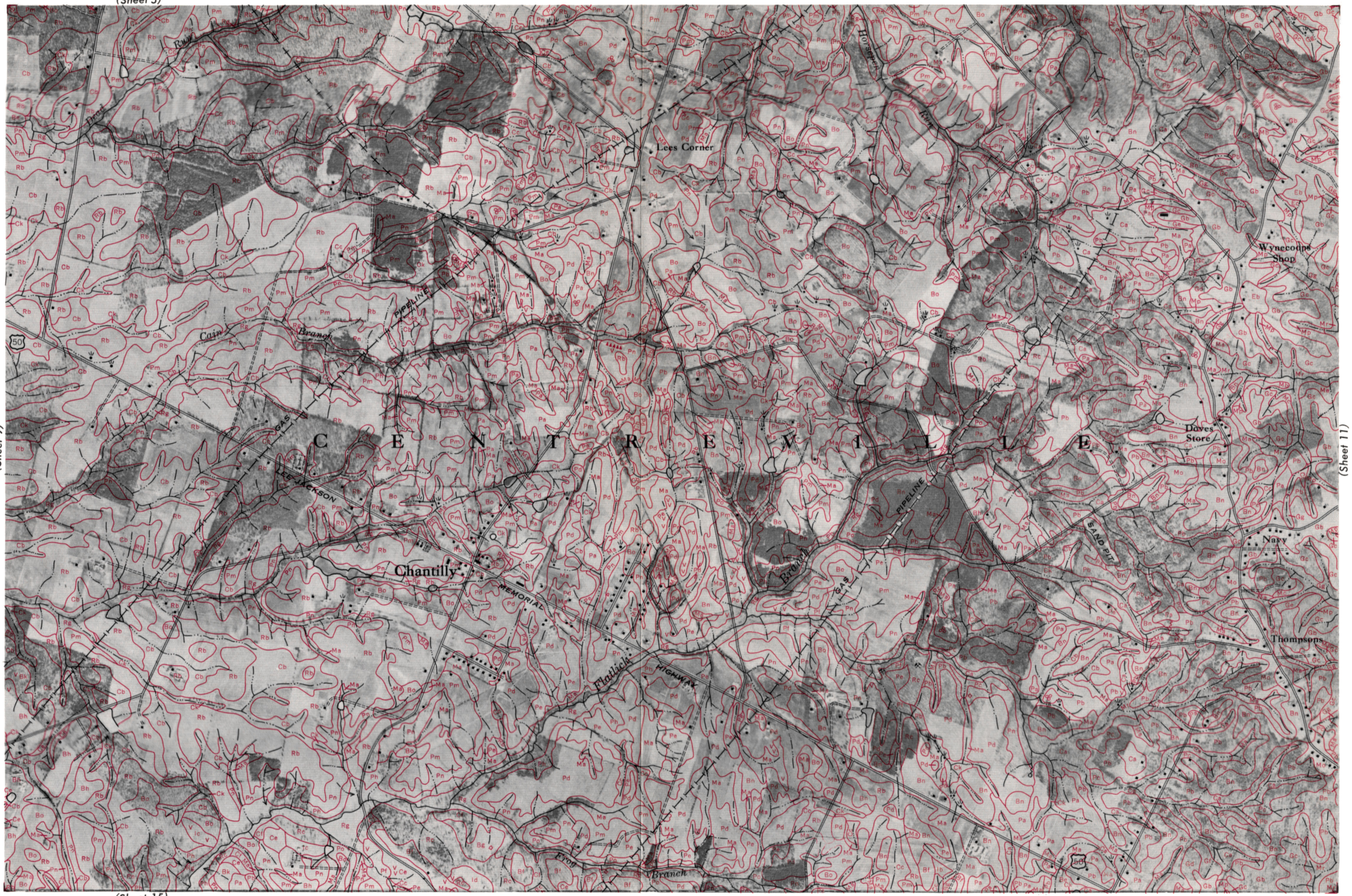

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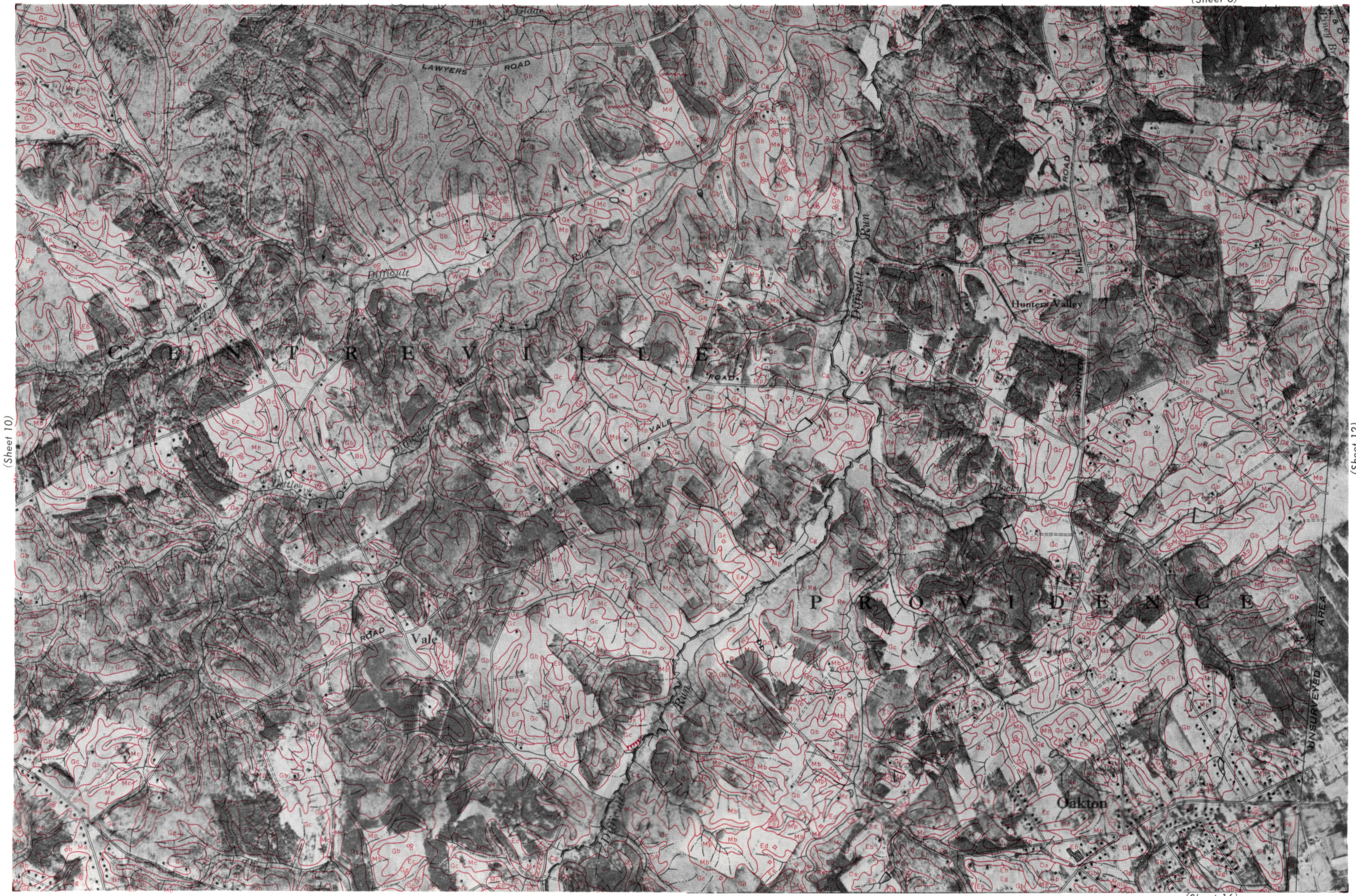

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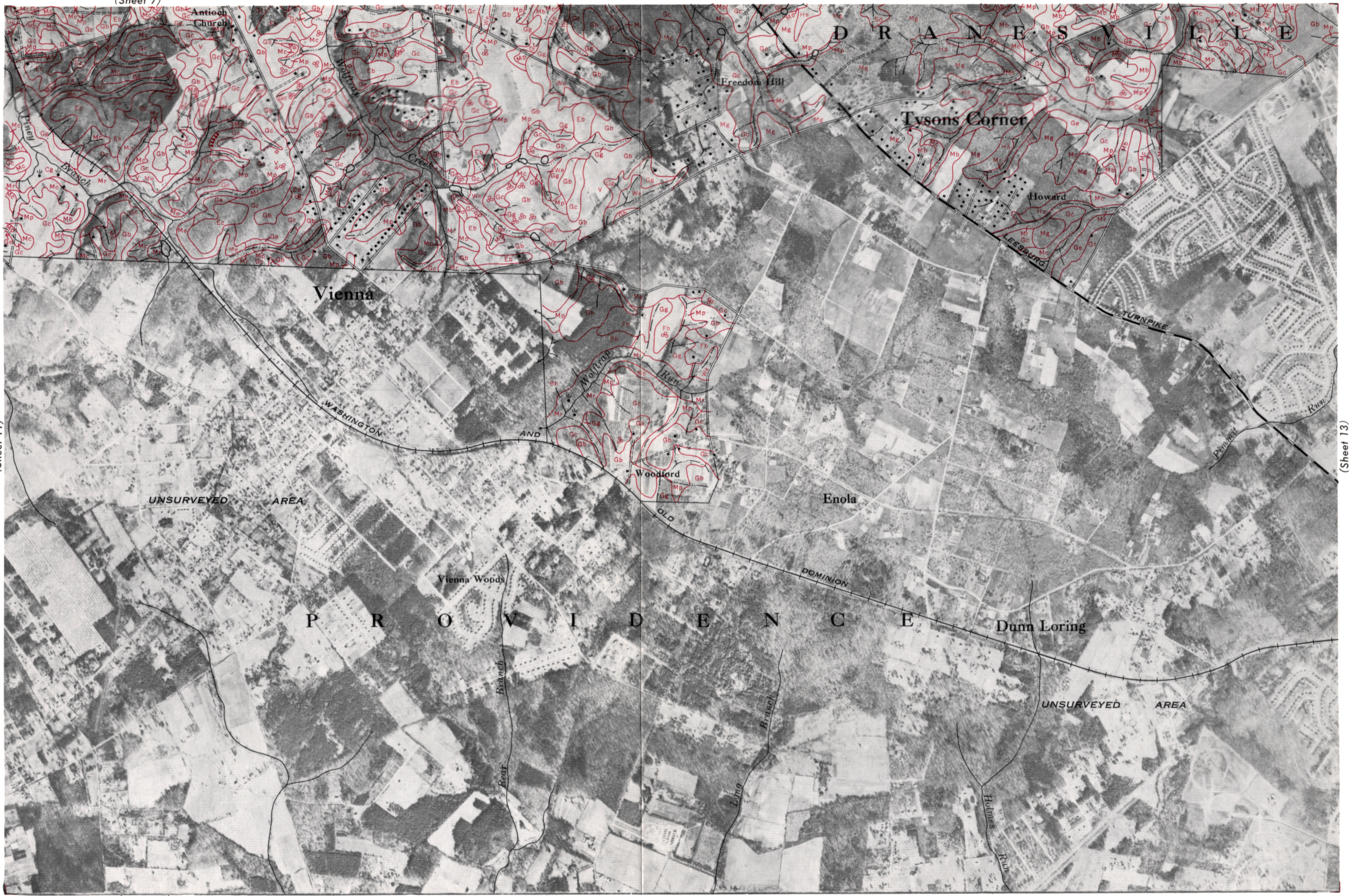

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FAIRFAX COUNTY, VIRGINIA

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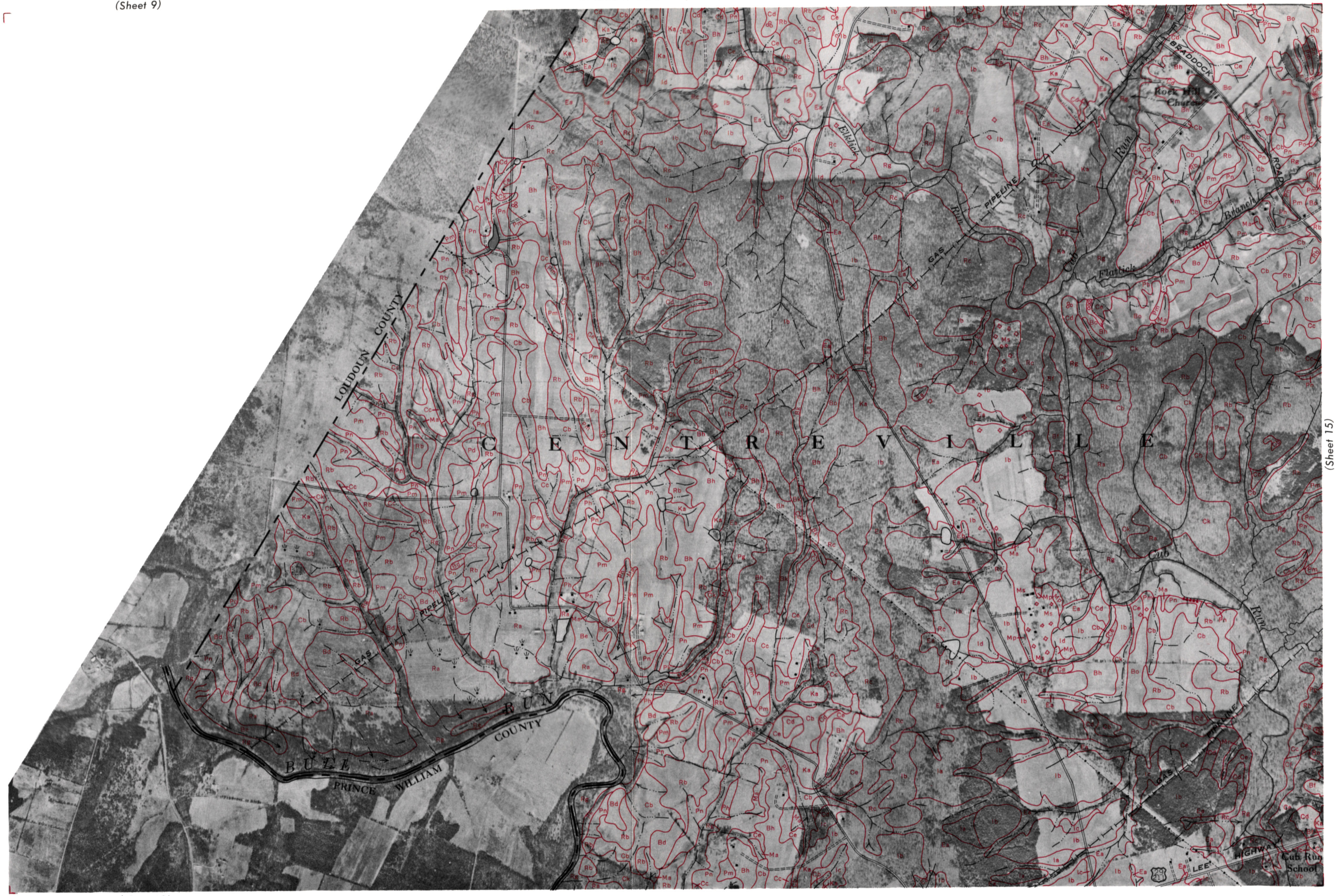

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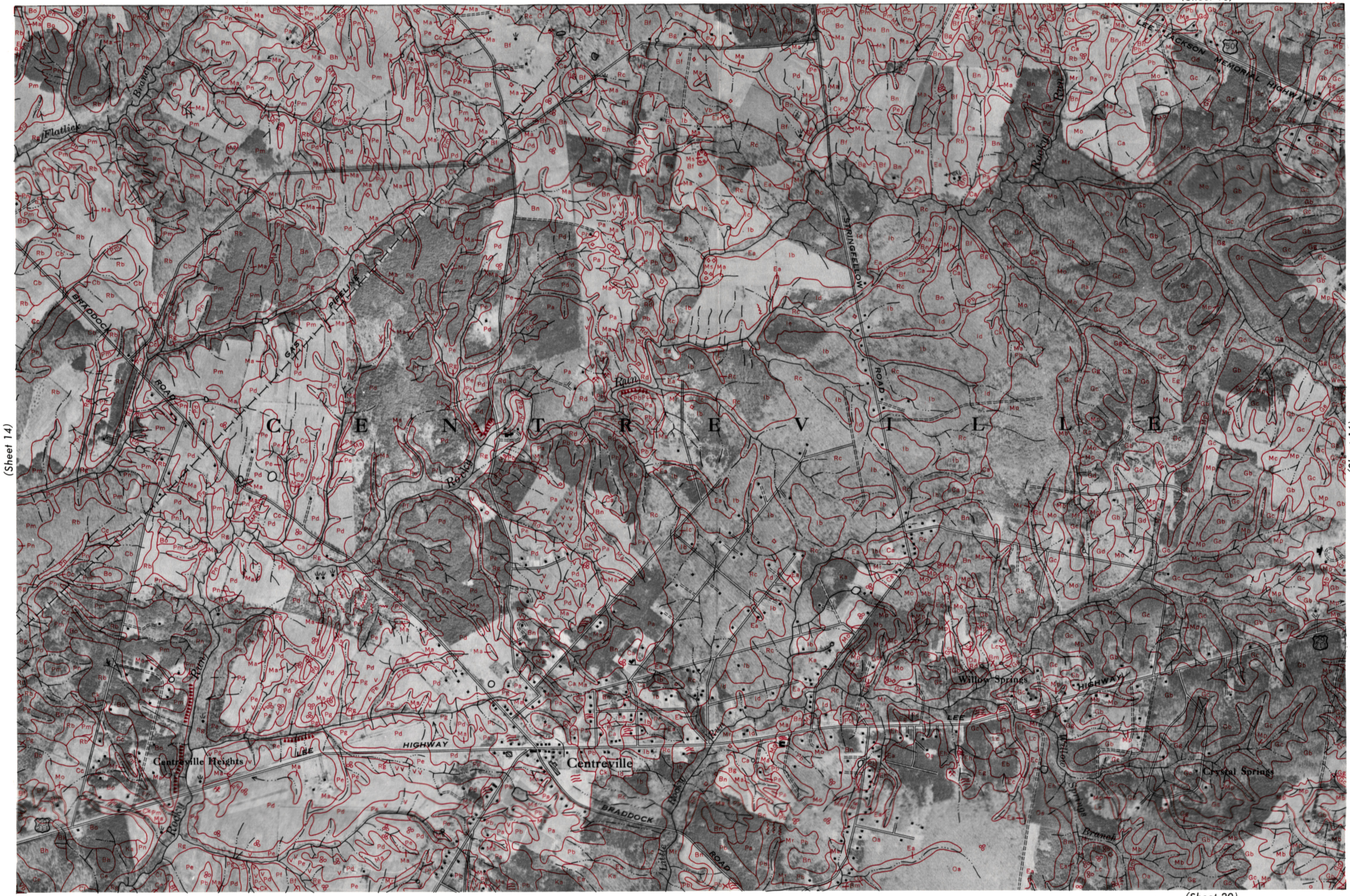

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FAIRFAX COUNTY, VIRGINIA

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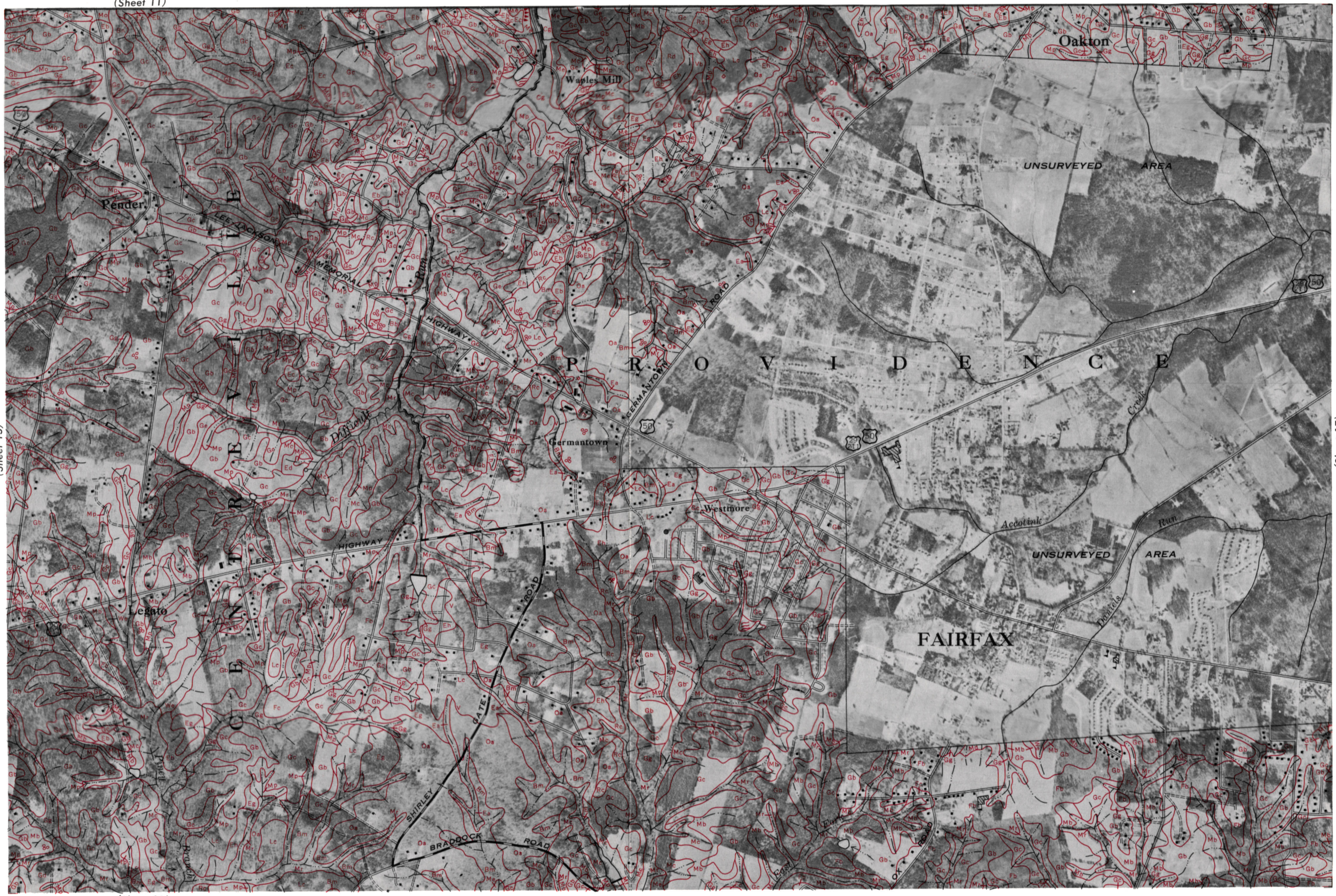

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FAIRFAX COUNTY, VIRGINIA

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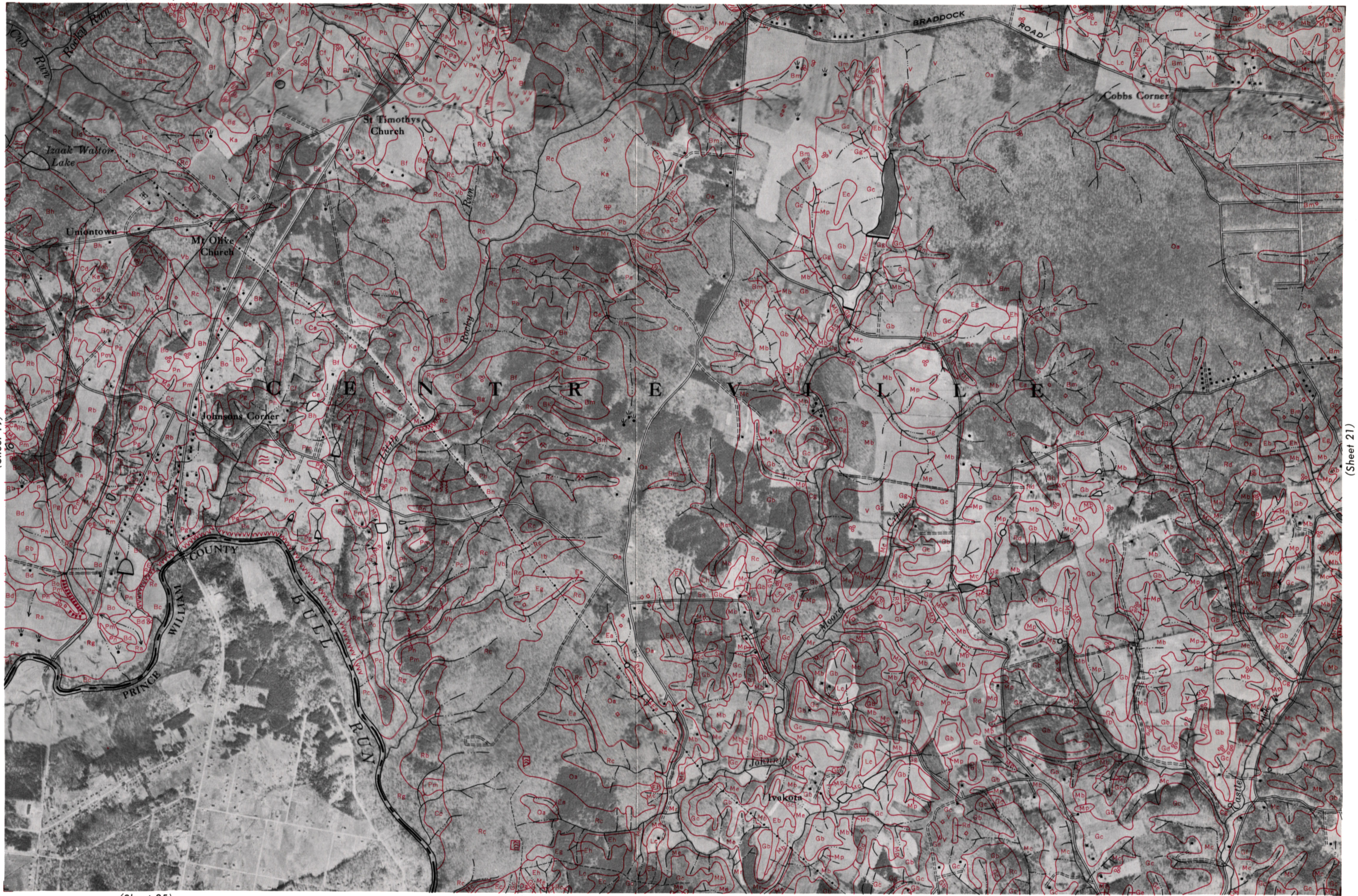

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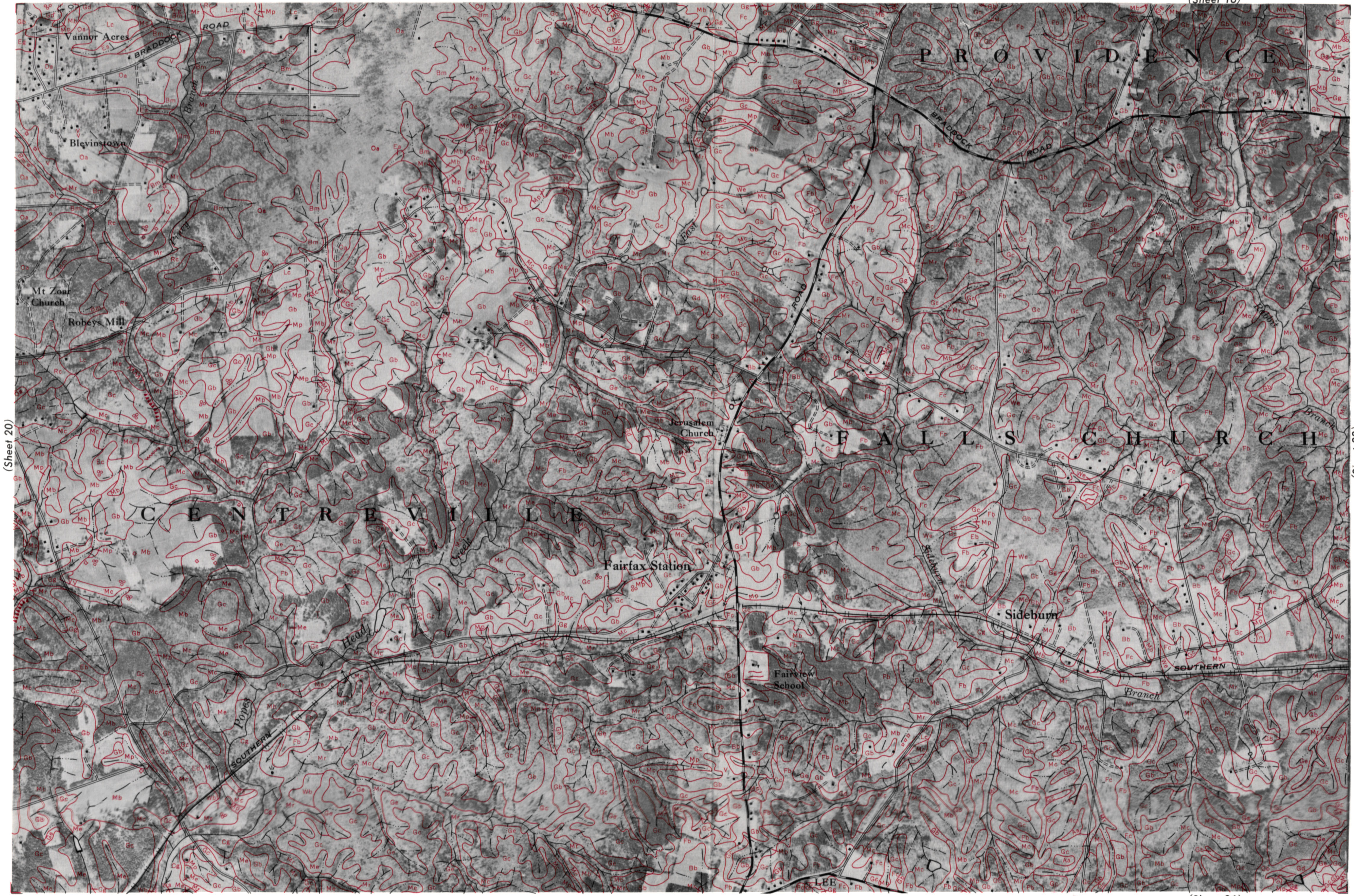

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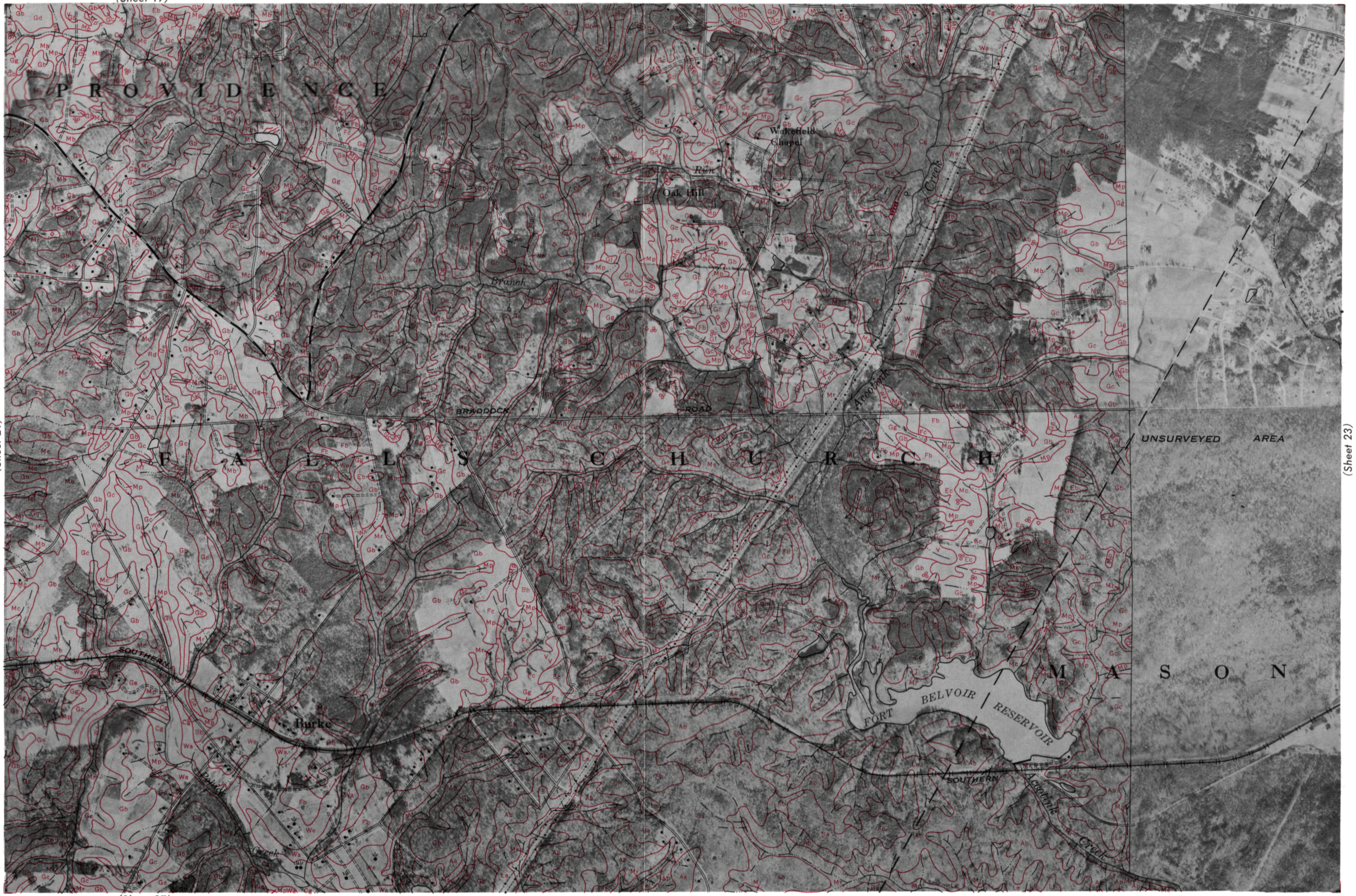

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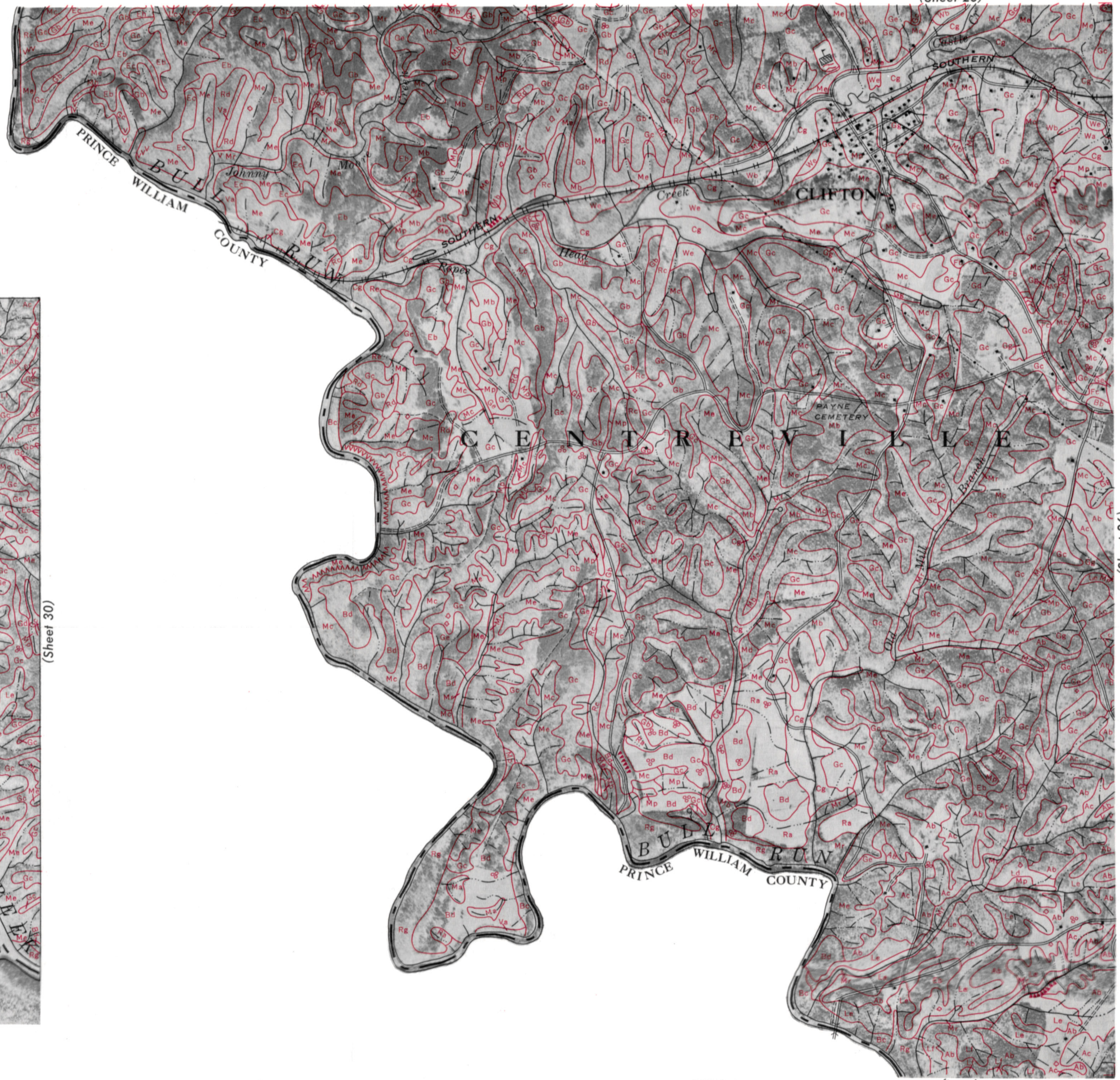

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FAIRFAX COUNTY, VIRGINIA

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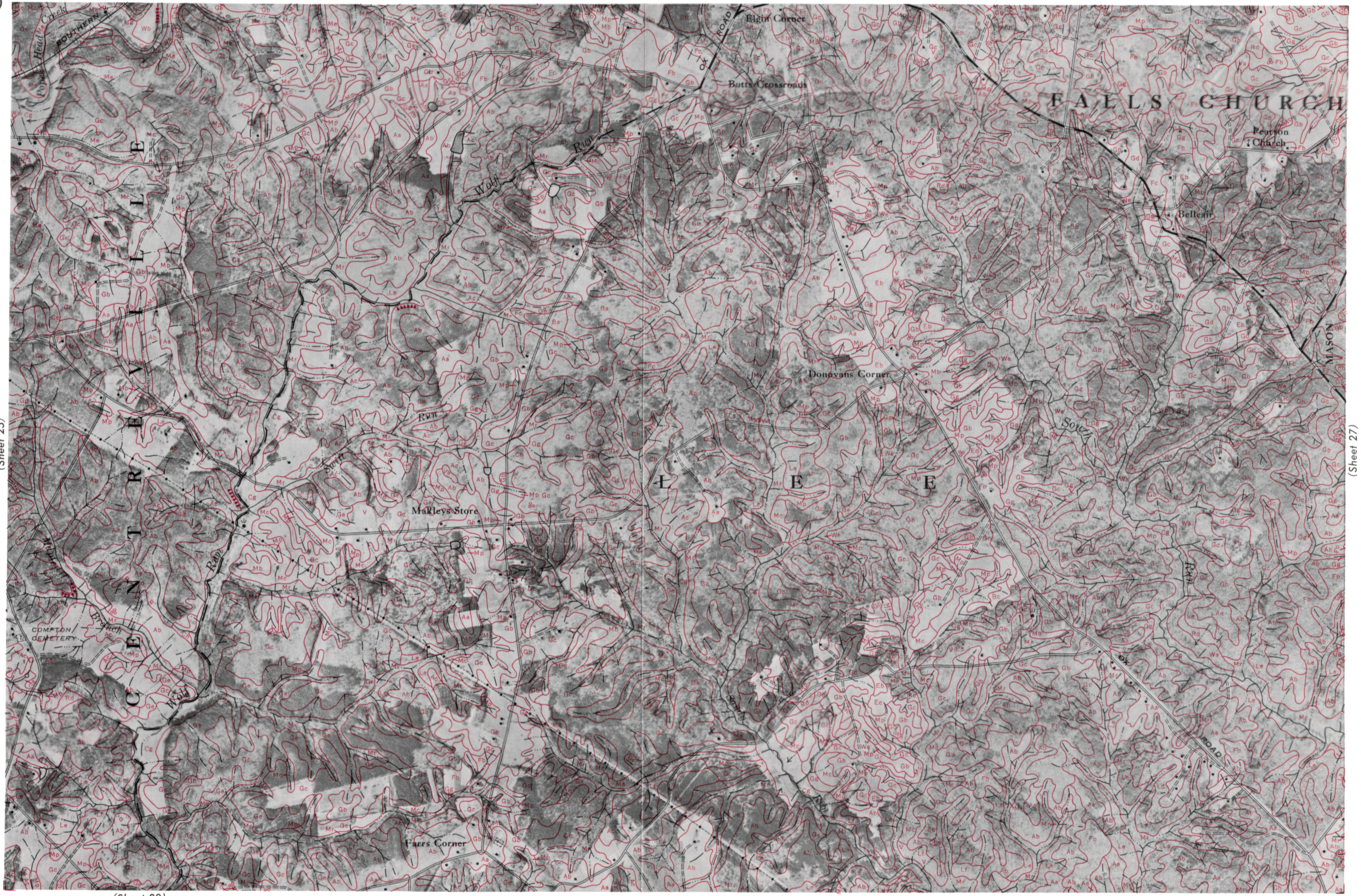

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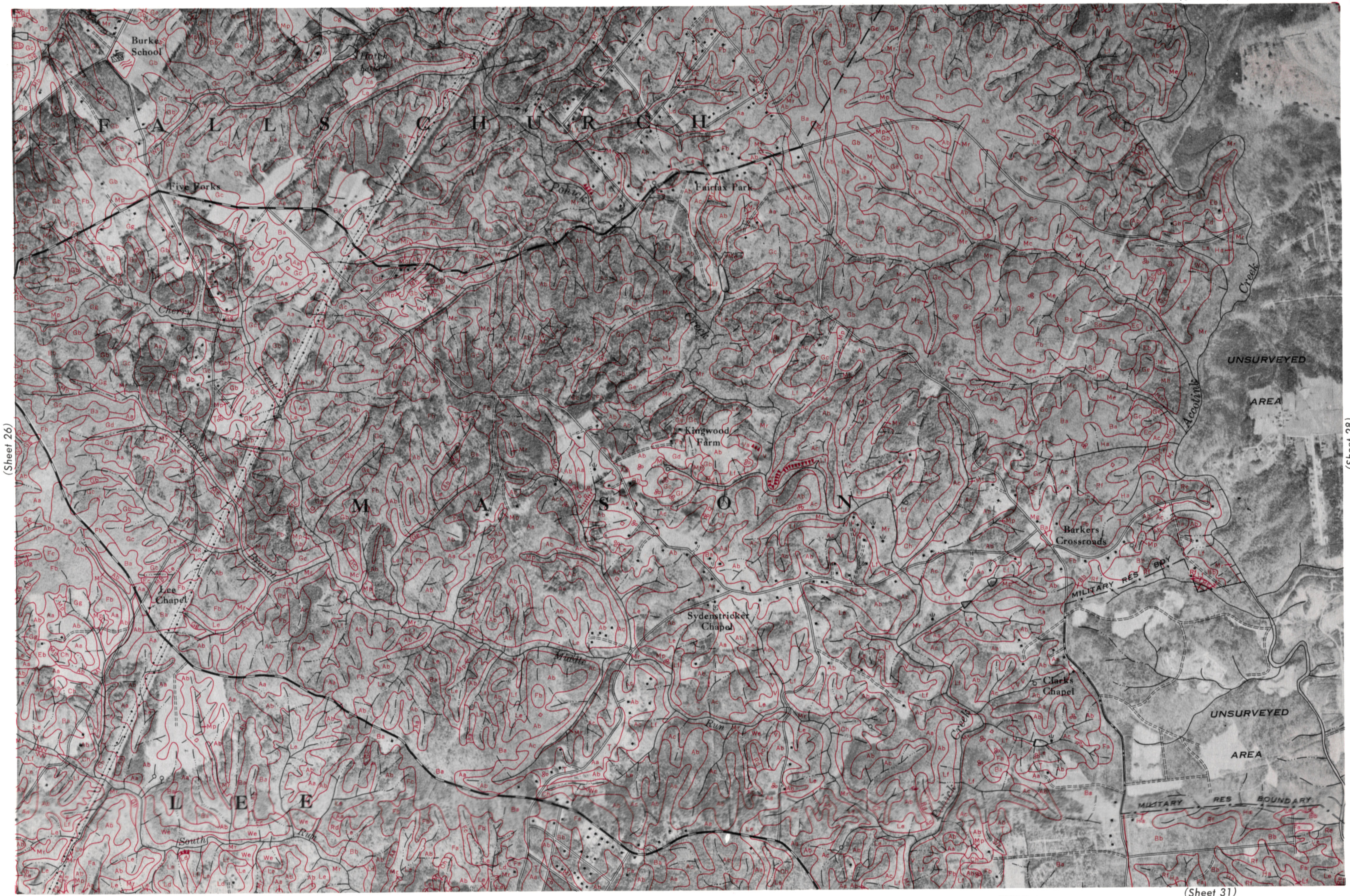

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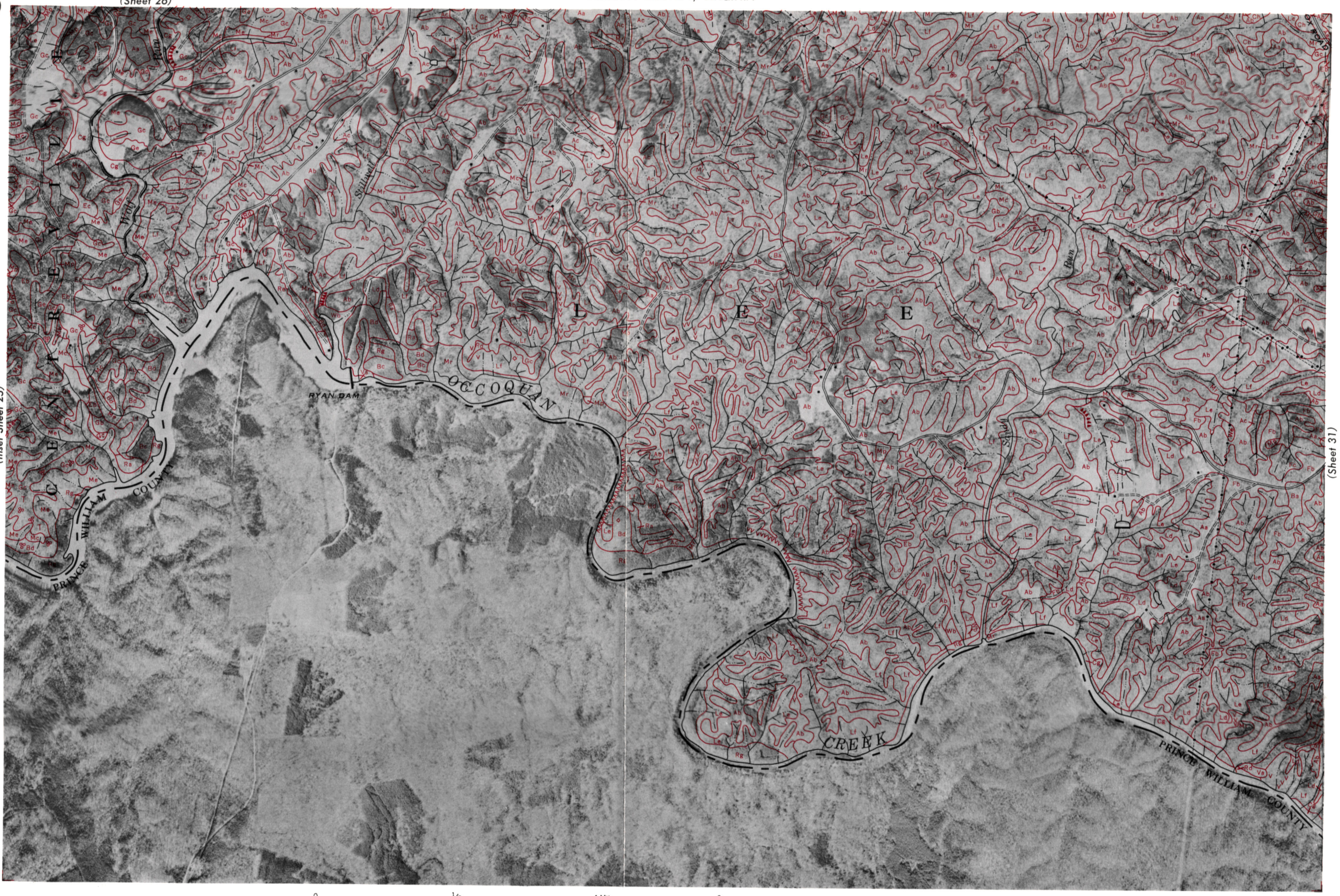
FAIRFAX COUNTY, VIRGINIA



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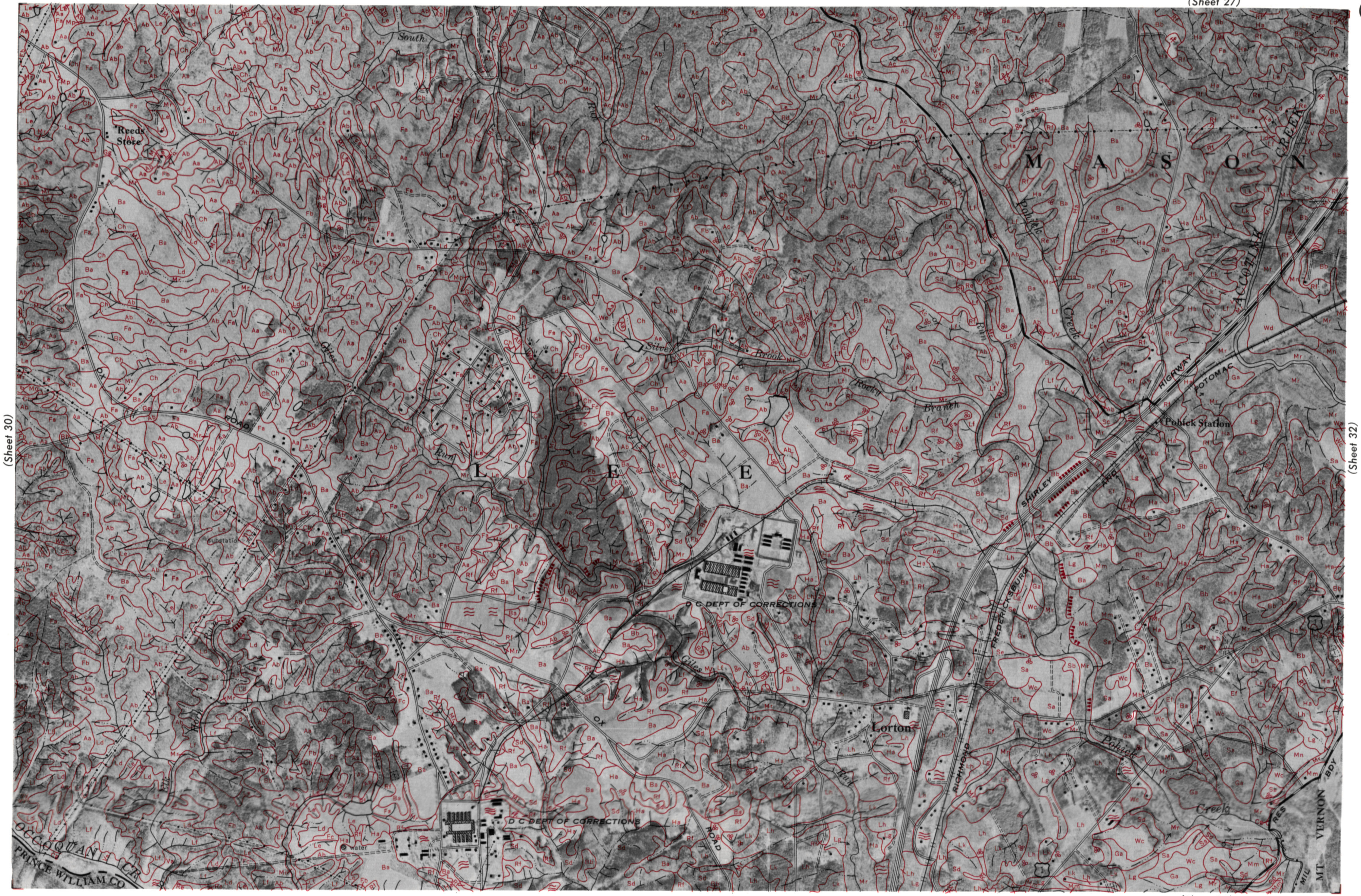

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FAIRFAX COUNTY, VIRGINIA

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(Sheet 35)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1954.

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(Sheet 32)

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

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34

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

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(Sheet 32)

(Sheet 34)

(Sheet 36)

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

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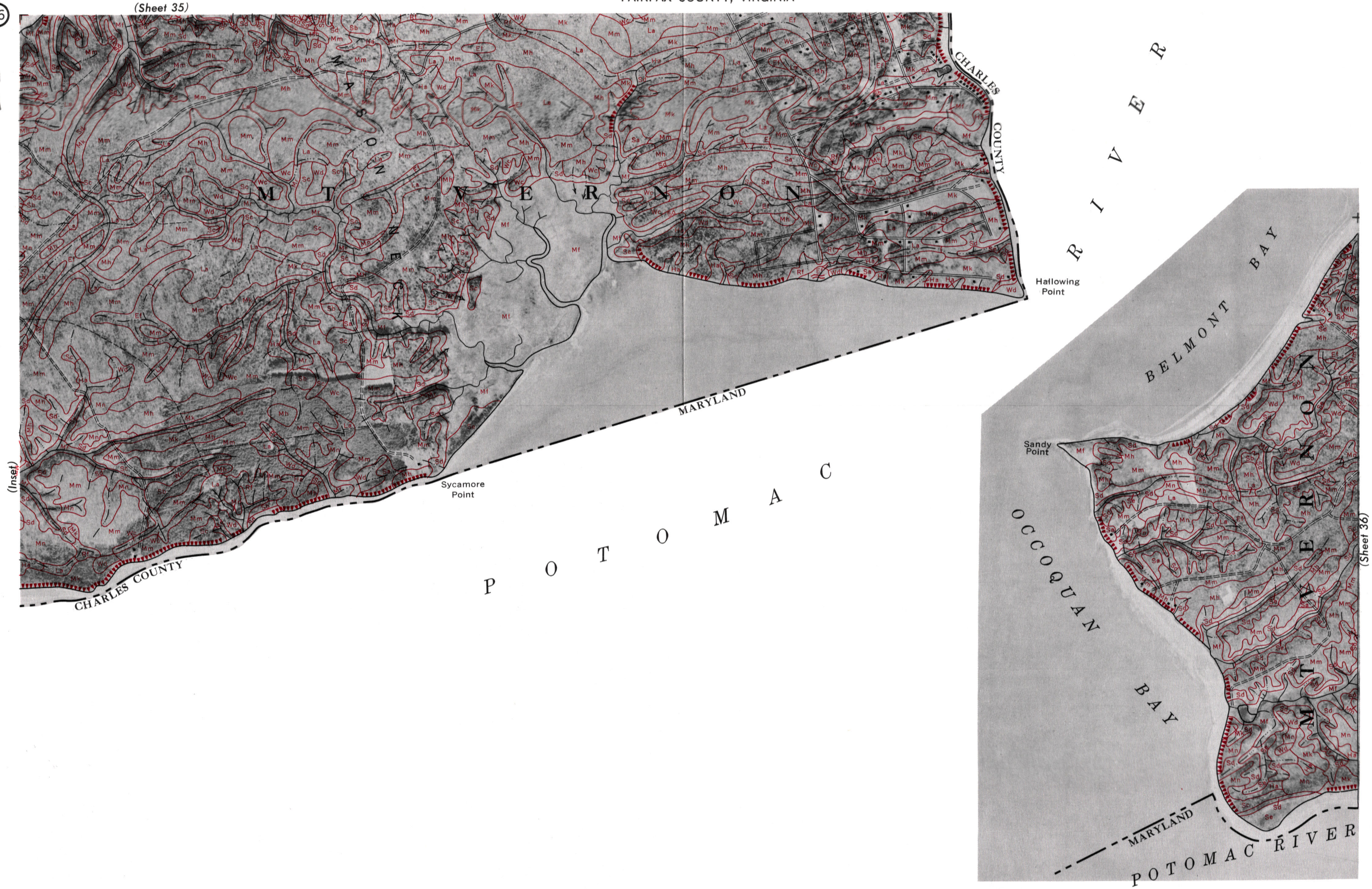

0 ½ 1 Mile Scale 1:20000 0 5000 Feet

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